

BULLETIN
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AMERICAN IRIS SOCIETY

MAY, 1945

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THE EDITOR'S BULLETIN BOARD

■ This issue of the BULLETIN contains a number of articles that should be of particular interest to the more serious students of iris lore.

First we have an article by Dr. Louise Dosdall describing the damage done to rhizomes infected by *Botrytis convoluta* and the methods of combating this disease. We are inclined to believe that until now many fanciers have been unaware of the existence of this disease and have been prone to ascribe to winter injury all instances of the rotting out of the bloomstalks early in spring.

The significance of the chromosome count in breeding iris is ably explained by Robert Schreiner, who enlarges upon the difficulties encountered in crossing diploid varieties with tetraploids.

Then there is Dr. Randolph's scientific study of embryo seed culture whereby the germination of iris seed is hastened and made more certain than by the usual methods of sowing them in cold-frames or open ground.

The Judges' Symposium is again the work of Kenneth Smith. It is gratifying to note that the number of Accredited Judges participating in this compilation is constantly growing and is evidence of the increasing interest in this activity of the Society.

The article by Ruth Hawtrey gives us an insight into the status of iris growing in a South American country and reveals the fact that horticulture is still more or less in its infancy in Argentina.

Mr. Hill has contributed another interesting story on recent developments in reblooming iris. A word of caution is needed, however, so that purchasers of so-called fall bloomers will not expect too much of these varieties in gardens north of Philadelphia.

The closing pages of this issue are devoted to the listing of registrations—the result of the painstaking labor of Mr. Gersdorff and Mrs. Colquitt.

F. W. CASSEBEER, *Editor*



Courtesy of H. J. Randall

Mary Shore, a new English origination, has exceptionally beautiful form. The standards are pale buff and the falls are light lilac-mauve.

JUDGES' SYMPOSIUM FOR 1945

KENNETH D. SMITH

■ THIS SIXTH Symposium, with 117 judges participating, may be considered the most representative of all those which have been conducted to date. Each year these Symposiums have increased in popularity and more and more of the Accredited Judges cooperate. A regional breakdown of the ballots received from the judges this year is as follows:

Region 1	(New England)	16	ballots from	30	judges
" 2	(N. Y.)	6	" "	20	"
" 3	(Penn., N. J., Del.)	2	" "	10	"
" 4	(Md., D. C., Va., W. Va.)	4	" "	15	"
" 5	(N. C., S. C., Ga., Fla.)	5	" "	17	"
" 6	(Mich., Ohio, Ind.)	15	" "	20	"
" 7	(Ky., Tenn., Ala., Miss.)	6	" "	18	"
" 8	(Wis., Minn., N. D., S. D.)	1	" "	5	"
" 9	(Ill., Iowa, Mo., Neb., Kans.)	24	" "	49	"
" 10	(Okla., Ark., Tex., La.)	5	" "	20	"
" 11	(Mont., Ida., Wyo.)	2	" "	2	"
" 12	(Utah, Colo., Ariz., N. M.)	5	" "	7	"
" 13	(Wash., Ore.)	7	" "	15	"
" 14	(No. Calif.)	5	" "	10	"
" 15	(So. Calif.)	14	" "	20	"
			" "		"
	<i>Total</i>	117	" "	258	"

In this year's Symposium ballots were sent to all judges. The ballots listed 251 iris which had received Honorable Mention or higher awards and which were listed in the five years. Judges were asked first to cross out all iris they had not seen in 1943 or 1944 and then to vote for their favorite 60 iris, placing 15 each in classes A, B, C, and D. They also had the privilege of placing in Class E the names of those iris which did not perform well and which, in their opinions, did not deserve to be included in a Symposium of the 100 outstanding iris. In tabulating, A iris counted 1.0; B iris, 0.8; C iris, 0.6; D iris, 0.4, and iris seen and not crossed out, 0.2 points. E iris counted zero points. The total points received by each iris were then divided by the number of judges seeing them and this gave their numerical rating.

JUDGES IRIS SYMPOSIUM, 1945

VARIETIES IN ORDER OF NUMERICAL AVERAGE (117 JUDGES VOTING)	(1944 Ranking)	Numerical Rating	Group "A" Iris, 1.0 Points Each	Group "B" Iris, .8 Points Each	Group "C" Iris, .6 Points Each	Group "D" Iris, .4 Points Each	Iris Seen, But Not Voted For, .2 Points Each	Group "E" Iris, 0 Points Each	Iris Not Seen
1. GREAT LAKES '38	(1)	.8868	76	13	8	5	4	..	11
2. ELMOHR '42	(7)	.7888	54	12	5	4	14	.1	27
3. DAYBREAK '41	(5)	.7325	40	17	3	4	19	..	34
4. PRAIRIE SUNSET '39	(2)	.7257	50	18	8	10	15	4	12
5. SABLE '38	(10)	.7132	37	28	13	15	12	1	11
6. OLA KALA '43	(6)	.7000	29	11	4	4	15	1	53
7. SPUN GOLD '40	(3)	.6725	44	14	11	4	26	3	15
8. WABASH '36	(4)	.6719	42	22	16	7	23	4	3
9. AMIGO '34	(13)	.6581	34	26	18	7	20	5	7
10. CHIVALRY '44	(—)	.6571	17	7	3	1	14	..	75
11. BERKELEY GOLD '42	(—)	.6448	16	9	7	3	14	..	68
12. DEEP VELVET '39	(8)	.6346	19	32	17	8	21	1	19
13. BLUE SHIMMER '42	(19)	.6337	24	17	9	5	19	3	40
14. VIOLET SYMPHONY '40 ..	(24)	.6324	21	17	10	5	21	..	43
15. TOBACCO ROAD '42	(—)	.6295	20	12	5	5	19	..	56
16. CAPTAIN WELLS '41	(25)	.6243	16	22	11	5	20	..	43
17. CAROLINE BURR '40	(16)	.6189	14	22	13	7	18	..	43
18. FAIR ELAINE '38	(14)	.6079	24	22	18	11	23	3	16
19. CASA MORENA '43	(—)	.6000	11	2	4	1	10	1	88
20. FRANCELIA '44	(—)	.6000	7	7	1	1	10	..	91
21. LORD DONGAN '40	(12)	.5929	19	10	2	2	24	..	60
22. GOLDEN FLEECE '40	(11)	.5894	27	14	15	5	34	..	22
23. GOLDEN MAJESTY '38	(9)	.5847	28	19	8	18	31	1	12
24. PINK REFLECTION '42	(41)	.5777	15	9	6	3	21	..	63
25. WHITE WEDGEWOOD '43 ..	(—)	.5767	11	10	3	2	16	1	74
26. REMEMBRANCE '42	(94)	.5761	14	12	15	4	22	..	50
27. SNOW FLURRY '39	(38)	.5727	21	18	13	3	30	..	29
28. LOS ANGELES '27	(31)	.5666	27	17	15	11	36	2	9
29. CITY OF LINCOLN '37	(17)	.5633	23	25	13	9	35	4	8
30. AZURE SKIES '43	(34)	.5594	18	9	10	5	27	..	48
31. TIFFANJA '42	(—)	.5523	13	5	3	2	18	1	75
32. THE RED DOUGLAS '37	(15)	.5509	28	16	11	16	34	5	7
33. INDIANA NIGHT '41	(22)	.5323	16	9	6	6	27	1	52
34. MOONLIGHT MADONNA '43 ..	(42)	.5322	12	9	7	9	22	..	58
35. EXTRAVAGANZA '44	(—)	.5266	7	5	3	..	15	..	87
36. RED VALOR '39	(30)	.5197	13	16	11	8	33	..	36
37. SOLID MAHOGANY '44	(—)	.5142	8	3	..	3	14	..	89

VARIETIES IN ORDER OF NUMERICAL AVERAGE (117 JUDGES VOTING)	(1944 Ranking)	Numerical Rating	Group "A" Iris, 1.0 Points Each	Group "B" Iris, .8 Points Each	Group "C" Iris, .6 Points Each	Group "D" Iris, .4 Points Each	Iris Seen, But Not Voted For, .2 Points Each	Group "E" Iris, 0 Points Each	Iris Not Seen
38. OLD PARCHMENT '39.....	(23)	.5090	17	13	19	9	40	1	18
39. GLORIOLE '33	(36)	.4940	11	27	7	9	45	1	17
40. THE ADMIRAL '41.....	(51)	.4936	16	7	10	11	35	—	38
41. SHINING WATERS '33.....	(56)	.4905	19	13	17	13	36	8	11
42. CHINA MAID '36.....	(45)	.4831	16	17	21	11	40	8	4
43. MULBERRY ROSE '41.....	(44)	.4821	10	14	8	5	36	—	44
44. LIGHTHOUSE '36	(61)	.4742	5	22	14	20	35	1	20
45. SUNSET SERENADE '43.....	(32)	.4720	7	9	2	9	23	—	67
46. TISHOMINGO '42	(21)	.4716	12	3	6	3	29	—	64
47. MASTER CHARLES '43	(—)	.4714	2	6	5	2	13	—	89
48. DREAMCASTLE '43	(—)	.4702	9	3	2	1	22	—	80
49. ARCTIC '40	(48)	.4687	13	15	13	10	41	4	21
50. STARDOM '41	(47)	.4659	12	11	14	10	39	2	29
51. MING YELLOW '38.....	(49)	.4652	16	13	9	10	42	5	22
52. MELITZA '40	(29)	.4597	10	14	15	18	36	4	20
53. ELSA SASS '39	(46)	.4576	15	9	18	15	43	4	13
54. DOWN EAST '43	(28)	.4560	3	6	—	2	14	—	92
55. GRAND CANYON '41	(73)	.4530	10	8	17	8	39	1	34
56. ANNE NEWHARD '40.....	(—)	.4500	3	5	6	2	15	1	85
57. PRINCE OF ORANGE '40.....	(69)	.4481	9	9	16	5	38	2	38
58. OVERTURE '44	(—)	.4466	5	3	2	4	16	—	87
59. BANDMASTER '44	(—)	.4437	6	1	5	2	18	—	85
60. ALBA SUPERBA '43	(18)	.4418	9	4	2	4	20	4	74
61. LADY MOHR '44	(—)	.4416	4	3	2	1	13	1	93
62. MATTERHORN '38	(53)	.4400	9	19	7	9	49	2	22
63. BROWN THRASHER '41.....	(20)	.4376	10	9	7	7	30	6	48
64. GOLDEN TREASURE '36.....	(50)	.4372	12	9	17	15	46	3	15
65. MARY E. NICHOLLS '39.....	(27)	.4325	9	13	8	4	44	2	37
66. CLOUD CASTLE '44.....	(—)	.4322	2	4	7	2	16	—	86
67. CALIFORNIA PEACH '41.....	(35)	.4318	7	13	5	6	35	3	48
68. SHARKSKIN '42	(—)	.4307	5	9	4	6	27	1	65
69. SNOW CARNIVAL '42	(55)	.4280	9	7	4	—	37	—	60
70. MISSOURI '33	(54)	.4261	9	18	12	10	55	3	10
71. COPPER ROSE '41	(33)	.4225	5	9	13	7	36	1	46
72. FRANCONIA '42	(26)	.4217	5	9	1	2	29	—	71
73. ORMOHR '37	(62)	.4213	10	14	13	14	44	8	14
74. RANGER '44	(—)	.4210	4	5	4	3	22	—	79
75. SIERRA BLUE '32.....	(85)	.4196	7	20	11	16	55	3	5
76. CHRISTABEL '36	(43)	.4192	7	13	20	8	55	1	13

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77. GUDRUN '30	(99)	.4185	9	13	16	13	55	2	9
78. FORT KNOX '41	(86)	.4172	15	1	2	--	36	4	59
79. LOUISE BLAKE '43	(—)	.4153	3	9	6	6	27	1	65
80. ANGELUS '37	(—)	.4131	11	8	10	12	47	3	26
81. FIRECRACKER '43	(82)	.4101	6	9	2	7	35	--	58
82. RUTH POLLOCK '39	(37)	.4099	9	13	12	9	56	2	16
83. STORM KING '40	(80)	.4095	4	8	8	11	31	1	54
84. FLORA ZENOR '42	(76)	.4088	11	10	8	11	43	7	27
85. NIGHTFALL '42	(79)	.4078	6	3	7	6	29	--	66
86. MINNIE COLQUITT '42	(68)	.4036	5	5	9	4	31	1	62
87. YELLOW JEWEL '39	(39)	.4028	2	8	14	10	35	--	48
88. GARDEN MAGIC '36	(81)	.4021	9	9	9	11	53	--	26
89. MELLOWGLOW '42	(98)	.4000	2	7	2	3	22	--	81
90. PINK RUFFLES '40	(—)	.4000	3	7	6	10	29	--	62
91. SEQUATCHIE '44	(—)	.4000	4	5	1	3	21	1	82
92. TIFFANY '38	(75)	.4000	7	11	17	18	54	2	8
93. JUNALUSKA '34	(66)	.3981	6	11	19	16	52	4	9
94. JASPER AGATE '43	(—)	.3945	6	3	1	1	26	--	80
95. CALIFORNIA TREK '41	(95)	.3933	2	6	2	--	19	1	87
96. BRIGHT MELODY '41	(59)	.3931	4	3	--	3	19	--	88
97. DISPLAY '42	(60)	.3918	5	7	3	2	30	2	68
98. MELANIE '41	(74)	.3916	3	12	8	5	44	--	45
99. SNOW VELVET '42	(—)	.3873	6	4	10	3	40	--	54
100. AZTEC COPPER '39	(—)	.3851	6	9	10	7	46	3	36

The tabulation shows that GREAT LAKES has become one of the immortals and it well deserves to be considered America's most desired iris. It does well in all localities and each year becomes even more popular. The spectacular hybrid iris ELMOHR now achieves second place, and the fine blend DAYBREAK ranks third. The 1944 Dykes Medalist SPUN GOLD, which held third position last year, has lost some ground and is now seventh in preference. The ever-popular PRAIRIE SUNSET stays well up in the balloting, in fourth place. Two recent introductions, CHIVALRY and BERKELEY GOLD, made a remarkable showing in this Symposium, placing tenth and eleventh respectively.

Twenty-five new iris are found in this Symposium. They are:

CHIVALRY (10)	BERKELEY GOLD (11)
TOBACCO ROAD (15)	CASA MORENA (19)
FRANCELIA (20)	WHITE WEDGEWOOD (25)
TIFFANJA (31)	EXTRAVAGANZA (35)
SOLID MAHOGANY (37)	MASTER CHARLES (47)
DREAMCASTLE (48)	ANNE NEWHARD (56)
OVERTURE (58)	BANDMASTER (59)
LADY MOHR (61)	CLOUD CASTLE (66)
SHARKSKIN (68)	RANGER (74)
LOUISE BLAKE (79)	ANGELUS (80)
PINK RUFFLES (90)	SEQUATCHIE (91)
JASPER AGATE (94)	SNOW VELVET (99)

AZTEC COPPER (100)

The following 24 iris which appeared in the 1944 Symposium this year did not receive sufficient votes to earn a place:

L. MERTON GAGE (40)	EDWARD LAPHAM (52)
LATE SUN (57)	GARDEN FLAME (58)
ICY BLUE (63)	BALMUNG (64)
COPPER PINK (65)	LOUVOIS (67)
STELLA POLARIS (69)	MARY VERNON (71)
WINTER CARNIVAL (72)	RED GLEAM (77)
MISSOURI NIGHT (78)	ROSY WINGS (82)
MAJENICA (84)	FRANK ADAMS (86)
LANCASTER (88)	WEST POINT (89)
GOLDEN SPIKE (90)	E. B. WILLIAMSON (91)
VATICAN PURPLE (92)	MISS CALIFORNIA (93)
BUTTERCUP LANE (96)	CORAL MIST (97)

In making the compilation, it was discovered that only 12 judges, or some 10 per cent of those voting, saw 90 per cent or more of the award iris listed on the ballot. With one exception, all of these judges came from eastern regions, probably because the distance between gardens in the East is not so great and it is possible for these judges to see more iris despite travel restrictions. One-third of the judges saw 75 per cent of the iris but only 58 per cent saw 50 per cent of the 251 varieties listed. The actual number of those judges unfamiliar with the iris listed is found in the last column of the tabulation under "Iris not seen."

As has been customary in the past, I have added a color classification arranging the 100 Symposium iris according to garden color and listing them in order of their popularity:

White

CAROLINE BURR, WHITE WEDGEWOOD, SNOW FLURRY, ALBA SUPERBA, MATTERHORN, SHARKSKIN, SNOW CARNIVAL, FRANCONIA, GUDRUN, SNOW VELVET.

White with Yellow Markings

FAIR ELAINE, GOLDEN FLEECE, MOONLIGHT MADONNA, ARCTIC, ELSA SASS, GOLDEN TREASURE, MARY E. NICHOLLS.

Bright Yellow

OLA KALA, SPUN GOLD, BERKELEY GOLD, FRANCELIA, GOLDEN MAJESTY, MING YELLOW, FORT KNOX, YELLOW JEWEL, CALIFORNIA TREK.

Orange, Tan and Brown Effect

TOBACCO ROAD, PRINCE OF ORANGE, BROWN THRASHER, AZTEC COPPER.

Red and Red Effect

THE RED DOUGLAS, RED VALOR, RANGER, CHRISTABEL, GARDEN MAGIC, JUNALUSKA, JASPER AGATE, DISPLAY.

Pink and Pink Effect

PINK REFLECTION, REMEMBRANCE, CHINA MAID, MULBERRY ROSE, LIGHTHOUSE, DREAMCASTLE, MELITZA, OVERTURE, ANGELUS, FLORA ZENOR, PINK RUFFLES, MELANIE.

Light Blue and Lavender

GREAT LAKES, CHIVALRY, AZURE SKIES, GLORIOLE, SHINING WATERS, TISHOMINGO, CLOUD CASTLE.

Medium Blue, Light Violet or Mauve

VIOLET SYMPHONY, THE ADMIRAL, BANDMASTER, MISSOURI, SIERRA BLUE.

Purple

SABLE, DEEP VELVET, CAPTAIN WELLS, LORD DONGAN, INDIANA NIGHT, SOLID MAHOGANY, MASTER CHARLES, DOWN EAST, ANNE NEWHARD, STORM KING, NIGHTFALL.

Blue Plicata

BLUE SHIMMER, LOS ANGELES, MINNIE COLQUITT.

Yellow Plicata with Red, Rose or Brown Markings

TIFFANJA, FIRECRACKER, RUTH POLLOCK, TIFFANY.

Amoena and Neglecta

WABASH, AMIGO, EXTRAVAGANZA, LOUISE BLAKE.

Variegata

CITY OF LINCOLN.

Blends

DAYBREAK, PRAIRIE SUNSET, CASA MORENA, OLD PARCHMENT, SUNSET SERENADE, STARDOM, GRAND CANYON, CALIFORNIA PEACH, COPPER ROSE, MELLOWGLOW, SEQUATCHIE, BRIGHT MELODY.

Hybrids

ELMOHR, LADY MOHR, ORMOHR.

CYCLE OF AN IRIS BORER

CHARLES ULYSSES BEAR

■ JULY AND August are the months in which to start investigating for the iris borer.

1. In September and October a moth appears. Named *Macronoctua Onusta* (pronounced Mac-row-nock'two-ah On-us'tah) by Grote in 1874, it is a night flying moth of the large family of the Noctuidae (Nock-two'i-dee), genera 375, species over 2,000. The moth is illustrated in color of purplish-black, in *The Moth Book* by W. J. Holland, published by Doubleday Page & Co., 1920; page 176½, figure 18, plate XX.

After birth, this moth mates in three or four days and in a few more days starts laying a cluster of 25 to 30 minute eggs, occupying about a half-inch in a crevice in an iris leaf, repeating until 150 to 200 eggs are laid. The size of the egg is 1/50 of an inch.

2. In the winter months, the moth finally becomes extinct.

3. In April and May the eggs become young minute larvae (lar'vee). The grub, or tiny caterpillar-like creatures, are the baby iris borers, pinkish in color with a brown head. They soon measure a half-inch in length. These larvae start crawling upward, eating pinholes into the iris leaves and along the edges, tunneling into the tissues downward into the central leaf-sheath. They shed a few times before entering the rhizome, which is a tuber-like storehouse of the iris plant. The roots of the iris are like enlarged hairs descending from the rhizome.

4. In June and July, the young larvae become the adult larvae, about two inches long, which are now commonly called the iris borer, and only one, the "survivor of the fittest," is found alive in a rhizome. After having a last banquet in the rhizome, it tunnels out to

pupate in the soil five or six inches away, slanting downward to a depth of from two to five inches. Occasionally one has been discovered ten inches directly below the plant.

5. In August and September, the adult larvae take one month in the pupal, or chrysalis (kris'ah-lis) stage to become pupae (pew'pe).

Again in September and October, a pupa moves upward to the surface, then a moth is born. It emerges, flies away just about dusk, or on dark cloudy days, to another iris, avoiding sun and wind, preferring a crowded garden. Seldom have they been caught in lighted traps and a new generation starts completing the cycle in one year.

To visualize the size of these very small eggs divide an inch into fifty lines and use a magnifying glass to observe the eggs all beautifully sculptured, cylindrically shaped, flat on top and bottom. These eggs are shining-white when first laid in September or October, but in three or four days the color changes to a yellowish tone, then in seven or eight days to a distinctly brownish color.

In the next three or four weeks they become a delicate pink and much later, in the spring about two weeks before hatching, they appear an extremely delicate lavender. Just before hatching in April the color becomes more intense lavender. Out of the 150 to 200 eggs laid, only about one-half are hatched. Of these, many are cripples, others disappear after six or seven weeks of toiling, and some migrate to other iris plants, which is a reason why only one borer is found alive in a rhizome.

Stop worrying about the iris borer. Get busy, dig down 12 inches, take up a sick plant with surrounding soil, put it with the soil in a tub, or large bucket, soak and cleanse it carefully to ascertain the trouble, start treatment, remove the infected part of rhizome and leaves. Cover the wound with powdered gypsum, sulphate of lime, or plaster of Paris and replant, for a rhizome will grow again even if half eaten away—or destroy and purchase another from the originator.

Destroy the weeds, cut back the leaves similar to a fan in September or October to locate any beginning of trouble. Divide and transplant regularly every three years for safety and greater increase.

Acknowledgement for most of this information is given to Mr. Edward Bruce Williamson (1877-1933), distinguished iris breeder and naturalist of Bluffton, Ind.

BOTRYTIS CONVOLUTA CAUSES WINTER RHIZOME ROT

DR. LOUISE DOSDALL

*Assistant Professor of Plant Pathology,
University of Minnesota*

■ IN NORTHERN REGIONS, winter killing of iris is of more or less annual occurrence. The loss is quite generally attributed wholly to freezing. However, in 1932 Whetzel and Drayton^{1, 2} described a new species of fungus *Botrytis convoluta* which is parasitic on varieties of rhizomatous iris developed from the species *Iris germanica*, *I. pallida* and *I. plicata* and which attacks the plants during the fall, winter and early spring. They reported the disease in New York and Washington states and in Ontario, Canada. It had also been intercepted on iris rhizomes shipped into the United States from France, Germany, England and Holland. It has since been reported from Minnesota, New Jersey, Idaho, Missouri and British Columbia. The development of the disease on iris shipped into Minnesota indicates that the disease is present in other states, both in the eastern and the western parts of the country. Considering the extensive interchange of iris, it is probable that the disease occurs wherever conditions are favorable for its development.

In 1934 botrytis rhizome rot caused a great deal of damage in numerous iris plantings in Minnesota and studies were begun on the nature of the disease, the annual losses and possible control measures. The following information is a result of these studies and applies particularly to the development of the disease in Minnesota.^{3, 4}

Botrytis rhizome rot is primarily a disease of dormant iris. Probably most of the losses have gone unnoticed because they have been confused with winter killing. When frozen, the cells of the rhizome and young leaves are injured by the formation of ice crystals. After the iris have been killed by freezing, the rhizomes either shrivel and dry, or are softened by a wet rot with a very characteristic sour smell. Except for the odor, this soft wet rot following freezing is

¹Whetzel, H. H. and F. L. Drayton. A new species of *Botrytis* on rhizomatous iris. *Mycologia* 24: 469-476. 1932.

²Drayton, F. L. The perfect stage of *Botrytis convoluta*. *Mycologia* 29: 305-318. 1937.

³Dosdall, Louise. Botrytis crown rot of iris. *Minnesota Horticulturist* 69: 123, 131. 1941.

⁴Dosdall, Louise. Rhizome treatments for controlling Botrytis crown rot in Iris. *Phytopathology* 34: 772-789. 1944.

very much like the common bacterial soft rot so often found on iris during the summer. On the plants killed by botrytis, the young fans fail to develop and are soon covered with a gray-brown, velvety growth which consists of the spores of the fungus (Fig. 1). These spore masses on the young shoots are so nearly neutral in color that they blend into the color of the dead leaves and soil and are easily overlooked. The interior of the rhizome itself is converted into a dry, buff-to-gray, odorless, felt-like rot which is very different from the soft, mushy, sour-smelling rot which follows freezing injury. Botrytis and wet rot are seldom found in the same rhizomes. Great masses of black, bead-like bodies, the sclerotia of the fungus, are found on the surface of diseased rhizomes (Fig. 1).

Under conditions prevailing in Minnesota the period of maximum activity of the fungus varies greatly from year to year. It will grow and rot iris slowly at temperatures below freezing. In some years practically all the damage is done while the plants are still covered with straw or snow. When the snow melts and the covering is removed in March or April, many plants have been killed by botrytis

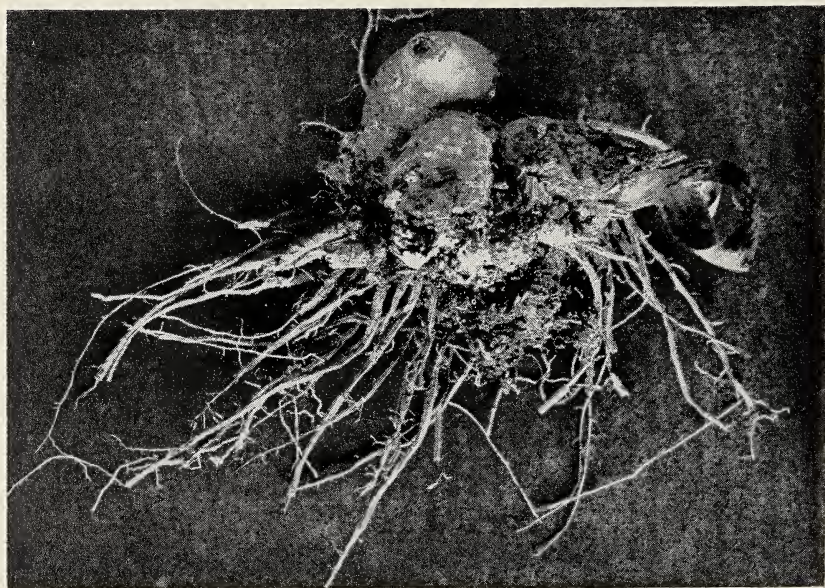


Fig. 1. Iris rhizome rotted by the fungus Botrytis convoluta. Note the masses of black sclerotia on the right side of the rhizome and the velvety patch of conidia at the base of the leaves.

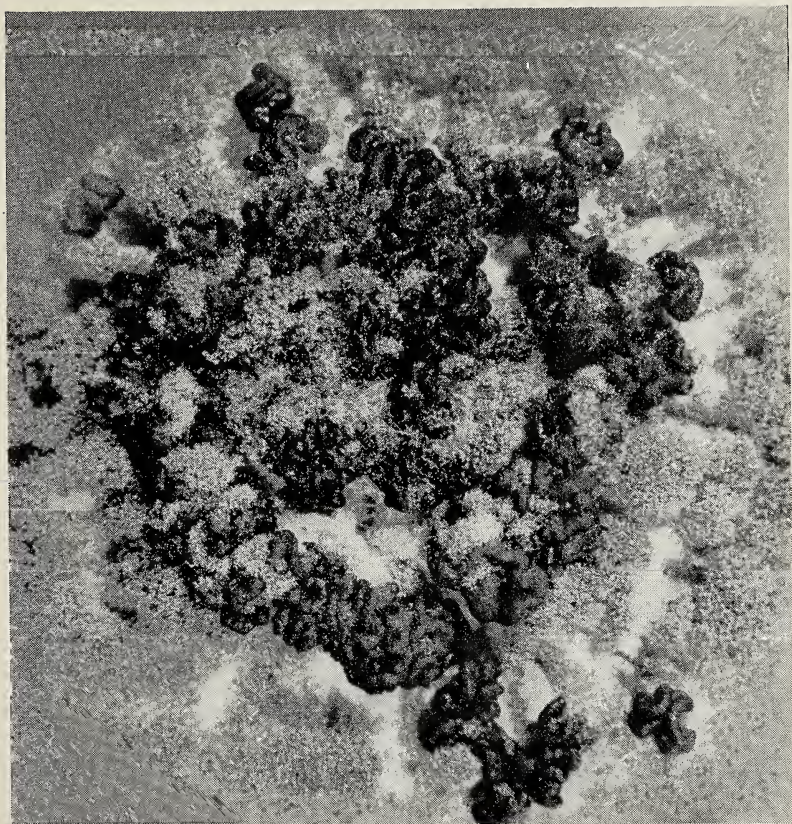


Fig. 2. An enlarged view of the black sclerotia and gray conidia which causes Botrytis winter rhizome rot of iris.

and the sclerotia have already formed. Such plants loosen easily from the soil and are raked out with the straw. If the weather is warm and dry in April so that the iris grow rapidly, no further damage is done. If, on the other hand, it is cool for several weeks, or months, the rot will continue to develop and sclerotia and spores will be formed in great abundance. Thus, in some seasons the fungus may cease suddenly to attack the iris in late March; in others it will continue to develop even into June.

It is only during this period in spring that the disease is detected easily in an iris planting. The only thing that can be done to control the disease at this stage is to dig out the infected plants and destroy them. The disease may seem to be of little consequence be-



Fig. 3. A clump of iris in which only part of the fans has been killed by Botrytis. Fans to the right are growing normally.

cause in clumps of iris where only some of the fans have been killed, others will grow normally (Fig. 3) and by midsummer may be among the best-looking plants in the garden.

While the iris is growing, the fungus apparently ceases its activity. During a dry summer the spores and sclerotia lie dormant in the soil around the growing plants. In a wet summer they are themselves destroyed by other soil microorganisms. In July and August when the iris are lifted and divided, there are no conspicuous signs of the botrytis disease by which one can recognize and discard rhizomes that are not safe to plant. Each fan has produced a new section of rhizome which is firm and hard. The old rhizome

may have decayed but the decayed portion is neatly corked off from the new.

In the late summer and early fall, when active growth of the iris plant ceases, the fungus begins its work again. Hyphae from the sclerotia or spores which have remained in the soil during the summer, or dormant hyphae in the dead leaf scales on the rhizome, begin to grow. They enter the iris plant through weak spots: the base of the old flower stalk, the base of the dry outer leaves of the fan, the cut surface of the rhizome and the old or broken roots. During a long-continued period of cool humid weather, spores and sclerotia may be formed at these points before winter sets in. In most years, however, when the iris are covered for the winter, or when the snow falls, the plants appear in excellent condition. But during the long dormant period, if the temperatures under the snow or winter mulch are around freezing or above for a considerable period from November to March, the iris rhizomes may be completely rotted by spring.

The severity of the disease varies greatly from year to year. A high percentage of loss one year may be followed the next by only a trace of the disease even in the same planting. However, in every planting in which the disease has been found, it has persisted from year to year unless special methods have been undertaken to eliminate it. Some varieties develop the disease to some extent almost every year while others are infected only occasionally. This apparent absence of the disease for a year or two gives the impression that it is not serious and tends to disappear of itself and also leads the grower to minimize the need of control measures when they will be most effective.

Iris plants taken from an infested garden or field are likely to carry the disease into new plantings. Clean iris planted in a garden or field that previously contained botrytis-infested plants are likely to become infected if weather conditions are favorable for the development of the disease during the dormant period of the plant.

The most effective way of combating this disease is to treat iris rhizomes when they are transplanted and to plant the treated rhizomes in new soil. Various mercury compounds have been found effective. As the disease is widespread throughout the country and is likely to be introduced into gardens on rhizomes from almost any source, it is advisable to treat all new rhizomes before planting them. Here are three methods of treating the rhizomes which have been

found successful in controlling botrytis rhizome rot of iris (the one which seems most convenient can be used) :

1. *Semesan (organic mercury compound)* : make a 0.25 per cent ($\frac{1}{4}$ of 1 per cent) solution according to directions on the container; submerge the roots, the rhizomes and three to four inches of the leaves in it for 30 minutes; remove and plant at once.

2. *Corrosive sublimate (mercuric chloride)* : make a 1:1000 solution (0.1 per cent) and soak the rhizomes as above for 30 minutes; plant at once. Corrosive sublimate is extremely poisonous and must be used with great care.

3. *Calomel (mercurous chloride)* : use one ounce to one gallon of water; dip the rhizomes into the white suspension in order to get as heavy a coating on the rhizomes, roots and bases of the leaves as possible; plant at once.

All of these solutions should be used in earthenware, glass or wood containers and the remaining solution disposed of in such a way that it will not harm animals or growing plants.

BEARDED IRIS IN ARGENTINA

RUTH HAWTREY

■ THE BEARDED IRIS in this country has been a Cinderella among plants, pushed away for years into dry and unprofitable corners of the garden, neglected and ignored. As no iris grows wild here, we may assume that the first ones were brought in by the early Spanish settlers from their homes in Spain where the iris had been a characteristic feature of the garden since the time of the Moslem conquest. These few primitive kinds, very widely distributed, are always to be found in the old gardens and, I have been told, also may be seen growing about the ruins of old Jesuit missions. One variety, not much more than a foot in height, has white flowers which open in July, our coldest month. There is also a blue counterpart, although not so commonly seen as the white. Frost is apt to brown the edges of their leaves but with the slight protection of hedge or overhanging boughs, they can be a charming feature of the winter garden, especially as their flowers open when the mimosa is in bloom. These iris, I think, might well be *I. albicans*, as described by Dykes, coming originally from Arabia and hence to Spain with the invading Moors.

The next to flower is a very dark purple self with a white beard which is practically everblooming as its flowers appear at intervals at all seasons of the year. Last to open is a taller, larger bicolor with standards of cool light blue and blue-purple falls, coming into flower when the plum blossom is out. All these kinds appear before the real iris season begins, which, in this country, is in October.

In the early days of this republic, when the people had freed themselves from Spanish domination, there followed a period of settled order, peace and prosperity, during which French fashions of living and culture began to supersede the old Spanish colonial ideas. Gardening and garden design followed the new trend and soon acquired a French form. Gardeners arrived from France, bringing many new plants and flowers and among them in all probability were the new hybrid iris created by Lemón. Thus we find in old nursery lists such names as AIXIA, ALZIRE, ARLEQUIN, CELESTE, JACQUESIANA, MADAME PAQUETTE, MADAME CHEREAU, MAJOR, REINE DES BELGES, ROLANDIA, HONORABILIS, LORD GREY, COMTE DE CLAIRE and many others, while the old QUEEN OF MAY came to us as REINE DE MAI.

Unfortunately, the iris is not a florist's flower and for this reason probably has been so little esteemed. Flower shows are comparatively new to this country, so until very recently it was mainly the displays in the shop windows and street vendors' baskets that influenced the direction of the general public's floral knowledge and taste. As these displays naturally ran to the more substantial and lasting qualities of the rose, carnation, calla and camellia, gardenia, orchid, dahlia or chrysanthemum, many beautiful garden flowers were entirely unknown. In a very few gardens enthusiastic amateurs collected and preserved what iris they could get, but the demand was so small in commercial establishments, iris plantings were neglected and the names soon got mixed up and lost. After World War I, a very few kinds again were imported and offered for sale but most of the iris that found their way into this country were brought back by amateur gardeners from their holiday trips abroad. It is to this period that we owe PROSPER LAUGIER, ALCAZAR, LORD OF JUNE, AMBASSADEUR, CORRIDA, GOLD IMPERIAL and, later, SALONIQUE, MORNING SPLENDOR, AUTOCRAT, PLUIE D'OR and L'AIGLON, with a few others whose names are now lost. These iris had only a very limited distribution and were to be seen in very few gardens.

Names and labels are always a problem as the usual hired gar-

dener is generally illiterate and even in the best regulated gardens labels are apt to be misplaced or lost. Thus it has come about that we have many anonymous iris and others masquerading under false names. And there is nobody with sufficient knowledge and authority to correct the confusion nor, till recently, have there been any books on iris to consult. One iris, for instance, brought to this country from England some years ago, has always gone by the name of BLUE BOY. It is a large, vigorous free-flowering plant with immense distinctive blooms though inclined to be a bit flimsy in texture. Its frilled standards are pale blue and the darker wavy falls pinkish-mauve fading to a lighter edge. Obviously not BLUE BOY, we thought at first it might be MAISIE LOWE of Wayman's 1942 catalogue, but could it not be BALLERINE? Certainly the lovely flowers ripple like ballet skirts when stirred by the faintest breeze.

Another iris, light blue and sweetly scented, has been nicknamed "Swan Neck" because its flower stems dip and bend. This, I think, might be CATERINA for its robust growth, large rhizomes and strong leaf-fans greatly resemble CATERINA's famous descendant PURISSIMA in which the drooping flower stalk has happily disappeared. The red-purple fulva hybrid was known for many years as Dalmatian iris, but Dykes' *Handbook* and the *Iris Check List* have been invaluable in clearing up this and similar mistakes.

Flower shows are quite a recent innovation in this country. Just 25 years ago the Buenos Aires Garden Club was founded by a small group of American women. It is an amateur association and the meetings are conducted in English. Its present membership, made up now predominantly of persons of British nationality or extraction, has increased to nearly 250, composed of a central club of 40 active members and nine branches in the outlying suburbs, together with a large camp or country membership of gardening enthusiasts whose homes are in distant parts of the land. The flower shows staged by the garden club, now suspended for the duration, have done much to stimulate interest in gardening and the love of flowers while members have been instrumental in introducing to this country many plants, old and new, and the English style of garden design.

The Sociedad Argentina de Horticultura was founded in 1936 by a group of garden enthusiasts headed by Señora J. Bullrich de Saint. It is a purely Argentine entity and is patterned on the lines of the Royal Horticultural Society to include professional and ama-

teur alike and, while still in its infancy, has already attained notable strength, for in the few years of its existence gardening and flower growing in all phases have taken immense strides forward, though the war has, for the time being, served to slow down activities.

One of the features of the Buenos Aires Garden Club's spring show has been its iris section, which always attracted great interest. At the last show, held in 1941, a number of iris received from the United States were exhibited. They included PURISSIMA, ELEANOR BLUE, SIERRA BLUE, LOS ANGELES, SAN FRANCISCO, CALIFORNIA GOLD, MELDORIC, ALTA CALIFORNIA and BERKELEY BRONZE, with GUDRUN and GOLDEN HIND from England. These, as you can imagine, created a sensation as they were such notable advances on all we had seen before, a sudden transition from the early hybrids to the wonderful creations of today. Members of the Sociedad Argentina de Horticultura were also greatly interested and now they include an iris section in their exhibition schedules. In their spring show (held last October) I was able to exhibit a few iris from a collection I had received in February, 1944. My exhibit included GOLDEN MAJESTY, BRUNHILDE, LIGHTHOUSE, LOUVOIS, SHINING WATERS and CHRISTABEL. I have since had many inquiries on how and where to get rhizomes but, unfortunately, the war and our unhappy political situation have now made it impossible for us to import any plants from the United States.

Iris acclimatize quite easily here and some will be sure to flower the first spring but often it takes several years of patient waiting till the first bloom appears. The difficult period is nursing the newly arrived rhizomes through the first summer, after which they seem to settle down and thrive. Of course, we have the usual iris troubles of root rot and leaf-spot but, so far, no iris borers have been found. Sow-bugs are an annoying pest in dry summers as they shelter in cracks and burrow under rhizomes, eating away at the new growth.

The climate in many parts of the country is very favorable for iris culture although the damp and often very wet winter must be guarded against while the long, hot and generally dry summer is apt to scorch and shrivel exposed rhizomes. Mild spells in mid-winter bring into bloom such early flowering kinds as NATIVIDAD and PURISSIMA and, though a frost may soon cut the flowers, it is never so severe as to injure the plants.

There are only four or five gardens in which the newer iris are growing though dozens of garden owners are clamoring for them.

Mrs. Alice Bell's magnificent garden at Estancia Grande had the most extensive collection of all kinds, old and new, to be found in this country. The iris were beautifully grown and arranged and always carefully labeled. However, her estate was recently expropriated by the government in pursuance of its new military expansion program and in the lovely grounds a wilderness of weeds, thistles and ugly barrack buildings now are sprouting everywhere.

Señora J. Bunge de Barreto possesses the most varied collection of newer kinds, which include many brought from England and France as well as from your country. There are also several collections of English iris but few of these compare with the magnificent hybrids created in America. MRS. J. L. GIBSON, while possessing a most notable color and texture, is so poorly branched that the flowers bunch badly. GUDRUN is, however, a most enchanting white, and GOLDEN HIND is a lovely bit of pure yellow. We also have the real BLUE BOY, SAHARA, SAPPHIRE, ALINE, BRUNO, APHRODITE, ROSE PETAL, KATE IZZARD, CONSTANCE MEYER, SENLAC, FALKLANDS, LILIAS and MRS. VALERIE WEST. The new French kinds include ANNE MARIE CAYEUX, always dependable; LUX, PLUIE D'OR, TUSSOR, MARQUITA, DÉPUTÉ NOMBLOT, LOUVOIS, while JEAN CAYEUX, SEDUCTION and SENSATION refused to settle down and were lost. Our latest American acquisitions include BRUNHILDE, COPPER LUSTRE, EXCLUSIVE, FRIEDA MOHR, GOLDEN TREASURE, MISSOURI, NARANJA, SANDIA, SHINING WATERS, WABASH, PERSIA, ORLOFF, VIOLET CROWN, THE RED DOUGLAS, AMIGO, GOLDEN MAJESTY, FAIR ELAINE, MISS CALIFORNIA, CHRISTABEL and GREAT LAKES. Only a few have flowered yet so we are eagerly awaiting next spring's iris season to see if the new flowers live up to their fame.

These names to readers of iris BULLETINS will seem very out of date but it is the best we can do for the present until export permits are granted to us again. Meanwhile, we can only read the glowing descriptions of the wonderful new hybrids you are raising in your gardens and hope that peace and happier international relations in the future will make them available to us some day.

Omission!

The Secretary regrets the omission of the name of Col. J. C. Nicholls, 114 Overlook Road, Ithaca, N. Y., from the membership list published in the last issue.

REBLOOMING IRIS

H. M. HILL

■ A FEW YEARS AGO Clint McDade said he would soon invite the members of the American Iris Society to come to his Chattanooga garden for a show of bloom in the fall. At that time fall bloomers were comparatively new and enthusiasm was contagious. However, as revolutionary as was this reblooming habit, real progress in establishing it has been slow, as has been any marked progress in any other line of iris breeding.

We eagerly hail the new high-raters and take great pride in announcing in the BULLETIN the comparative merits in our annual displays, but a glance back over any ten-year period of iris breeding will show how few of these new ones survive the test of time. It is true, good gardeners over a wide belt of our country extending from the Atlantic to the Pacific now can have very abundant fall bloom. In our garden last year, rebloom started in late August, and through all of September, October and until November 20 we had continuous and abundant bloom. Late in the season we dug single plants of SANGREAL and BOUNTIFUL BLUE that had mature seed pods, full bloom and many side buds yet coming. This can be accomplished only in seasons of ample rain and with constant cultivation and continuous cutting of bloom stems just as the first buds are about ready to open.

This early cutting induces a constant supply of new stems, but with these very vigorous growing sorts it is easy to keep whole long rows making a nice show of bloom, and at the same time furnishing a constant supply of cutting stems. These rebloomers gave us armloads of stems through ten weeks, but the supply never exceeds the demand. We ship a good many budded plants that go on and bloom in other gardens.

AUTUMN QUEEN is the most persistent continuous rebloomer. It gives bloom here in Kansas every month from early spring to late fall. In addition to this fine reblooming habit, it is the top white dwarf in quality. Here it has poor curling stamens entirely lacking in pollen and gives seed very rarely, although seed from it is reported in other sections. I can't help thinking that if our hybridists would be as persistent in efforts to cross this as many are with WILLIAM MOHR, we might get from it a much needed midget white and perhaps other small whites of high quality.

AUTUMN ELF is almost as persistent in reblooming. The French remontants also have the habit of giving occasional bloom through summer and fall but they are subject to rot here, and about the time they increase vigorously, rot strikes them. ELEANOR ROOSEVELT gives bloom one month in spring and three months in fall and George Allen, of San Antonio, Tex., reports bloom on it every month in the year.

Low branching is quite characteristic of several of our rebloomers. The low branch comes out just above ground, and if the main stem is cut just above the low branch when it first opens, it will shoot up and make a nice show. AUTUMN HAZE is low branching, free with bloom and extra large. MARTIE EVEREST and OCTOBER BLAZE are two of the tallest. Both have low and wide branching, occasionally up to 40 inches, and with four to six blooms open at one time.

As a result of crossing with these fall bloomers, we occasionally get one that seems to be an off-season bloomer rather than a persistent rebloomer. So far the attempts to get Plicatas, especially of the yellow ground class, have yielded plants which seemed more like off-season bloomers in that they gave bloom rather late in the season. GLADSONG is of this class; it is not vigorous enough in plant growth to be classed as a reliable rebloomer here, although it does better in the South.

Last fall we were very agreeably surprised with fine late bloom on two new ones. One of our own was a pink bitone, more pronounced in the contrasts than AUTUMN SUNSET, which is the most reliable pink fall bloomer to date; the other was from Jake Sass' BERTHA GERSDORFF series and seems a new break in color for the reblooming section. However, both of these were late, blooming in late October and still later in November. When we had some plants that were budded when a heavy freeze was predicted, we took them inside in buckets and had very nice bloom for Thanksgiving, and a stem of each of them lasted until Christmas. These will not be listed as reliable fall bloomers until further trials are made and they may never be of use as rebloomers except in the South.

Mr. Sass' AUTUMN FLAME is the finest and most reliable red rebloomer. It and AUTUMN SUNSET always give us very fine bloom in October, but our KANSAS INGLESIDE gives the finest and most brilliant warm red tone later in October. This is our finest red in the spring. It gives a wonderful show over a full month, and we

have hoped it might prove valuable in perpetuating its brilliant color in earlier rebloomers, but so far it has resisted our efforts at crossing.

In yellows, SANGREAL is the best. It is so very vigorous that it gives fine bloom four months in most every year and it has the requisite breeding tendency as it has abundant pollen and seeds freely. Of the older yellows, GOLDEN HARVEST had very fine form but was a shy, late fall bloomer. SOUTHLAND is very rich in its golden yellow but it, too, is a shy bloomer here and most always blooms right down at the ground, seemingly without a stem. It seems to be a great favorite in the South. FAR SOUTH has neat form but is late in fall bloom. GOLDEN CATARACT, which California growers seem to bloom at all seasons, fails to rebloom here, for which reason we advise SANGREAL as the best yellow. SOUND MONEY in the dwarf class gives fine golden yellow bloom on low stems but, like the French everbloomers, is quite subject to rot.

After growing fall bloomers for many years, we know the answer to the oft-repeated question, "Why don't I get fall blooms?" Several years ago one iris fan ordered ten plants each of AUTUMN QUEEN and ELEANOR ROOSEVELT for a group planting. Planted late in the fall these gave fair bloom the next spring, other nice rebloom in the fall. The purchaser was so delighted that she declared she wanted only those iris which would bloom two or three times every year in spring or in fall, and later, her plants refused to bloom at all. When I called on her, she complained bitterly that although the plants had multiplied wonderfully, they refused to bloom. When I walked with her to the group planting, the reason was very plain. The plants had multiplied wonderfully—in fact, they were a solid mat—but they had no room for further growth and could not send out the new and vigorous side shoots necessary to reblooming. Only one or two plants at the outer edge of her group gave spring bloom, but when I told her that she must transplant these, she did so in early summer and had nice fall bloom.

When a plant blooms in the spring it has fulfilled its mission in life and can rebloom only from new side shoots that have a chance to make vigorous new growth. Single plants of most of our vigorous growers will give early fall bloom from the first pair of side shoots; later, from the second pair; still later, from the third pair, and so on to the limit of the increase on the original rhizome. Of course, this plant must have ample moisture and good culture to go right

on blooming indefinitely. In the tropical frost-free sections, growth and bloom are continuous with varieties that become adapted to continuous growing but sorts which inherit hardy characteristics requiring a winter rest period do not thrive there. Slow-growing sorts cannot be expected to rebloom early. These should be discarded except where they are needed for origination of new colors or forms, but that the vigorous growing habits of these varieties that give early and continuous fall bloom are valuable is beyond question.

With us and with all commercial growers, poor slow-growers are eliminated from necessity because they cannot show a profit. If only the vigorous-growing varieties survive, why should hybridizers fail to discard poor slow growers as parent stock? Or should they use a cross of these vigorous growers to pep up the poor growers? Generally the shorter seasons of the northern states and sections of high altitudes are not favorable to rebloom but our enthusiastic friend Mr. Bloes, of Battle Creek, Mich., has had abundant fall bloom on most all the early rebloomers and I feel sure his success has been due to his fine growing practice of lining new plants each season and giving them good care. Probably the climate there provides ample moisture for good growth. We have reports also of fall bloom in New York, Virginia, Pennsylvania and New Jersey. In the wide open spaces extending broadly across the United States from Virginia and the Carolinas on the Atlantic through the middle states and in the Ozarks and the great Southwest, conditions usually are ideal for abundant rebloom. However, successful and abundant rebloom will come only for those who appreciate the abundance enough to give frequent transplanting and good care.

In our section with its annual drought—usually extending through July and August—good mulching or sub-irrigation will be a great help to vigorous plant growth. Good gardeners soon learn that fine specimen stems with perfect show blooms come as a direct result of close attention to the details of supplying the soil moisture requirements and the rewards for extra labor and attention are ample and satisfying.

DIPLOID IRIS CHARACTERS TRANSMITTED TO TETRAPLOID IRIS

ROBERT SCHREINER

■ THE PURPOSE of this article is to call attention to an unusual phenomenon in iris inheritance. The iris family is made up of hybrids derived from the conjunction and amalgamation as well as selective breeding of a number of iris species. The iris we grow are, in great majority, tetraploids—that is, they have four sets of chromosomes. One of the more striking characters of tetraploid iris is the greater size of the flower. However, such was not always the case. In earlier days many of our garden iris were diploids (two sets of chromosomes). This diploid race of iris generally has smaller flowers. An example would be the variety NO-WE-TA. A tetraploid example would be GUDRUN. The genetic implications of this are all the more important and generally less clearly understood. When we take up the study of genetics, we generally begin by studying the inheritance of diploid plants. For simplicity's sake we cannot go into the broad field of plant inheritance but I recommend that the interested pursue this further. A quick summation will point out that in diploid plants, for each factor the square is necessary to cover the complete variability range, while in tetraploids the ratio is raised to the fourth power. A one-factor basis for recovery of a diploid is one out of four, while in tetraploids it is one in sixteen. In nature it is not this simple as we deal with many more than one factor of inheritance. The foregoing may be wandering from the original thought of this paper but the important and interesting thing that has become an accomplished fact in iris development is that practically every one of the major colors we have in iris today has come up into the tetraploids in quite an unusual manner. The student familiar with ploidy in plants will find the development of iris quite unusual. The first garden hybrids, mainly raised in Belgium, France and England, were the results of intercrossing of two diploid species, *I. pallida* and *I. variegata*. During this period many color patterns were developed that we have today. Soon after the turn of the century, newer species of iris were discovered in Asia. Their flowers were much larger and their stems were tall and wonderfully branched. This is the origin of our candelabra branching. These Asiatic species—*trojana*, *cypriana*, *mesopotamica* and *richardi*—are all tetraploids.

It was natural that efforts were made to cross these two different sections of this ploidy series. The expected in crossing a $2n$ with a $4n$ is a triploid $3n$, the diploid contributing one set of chromosomes and the tetraploid contributing two sets. This phenomenon is known as cell division or mitosis. When the chromosome theory of inheritance was expounded, this was the most usual occurrence. Strangely, while we have a few triploid iris (see Dr. Randolph's list of $3n$ -36 plants), most crosses of the tetraploid and diploid have given practically no seed, due to character differences. But every so often one or two fine plump seeds and, more rarely, full pods, were harvested. The plants raised from these seeds generally proved to be tetraploids. This most unusual and rare occurrence takes place when the diploid plants yield an undivided egg at mitosis, so its egg has $2n$ chromosomes and it mates with normally reduced $4n$ pollen, which in reduction is $2n$, thus yielding a fertilized cell with $4n$ chromosomes, a tetraploid. These few plump seeds are the key to our whole rainbow of iris colors. The tetraploid Asiatic species had size but their colors were shadings of undistinguished lavender and light magenta.

The pioneers of iris breeding who laid down the necessary foundation work on which our modern iris are based start with the work done in France and England. The firm of Vilmorin had early use of the Asiatic tetraploids and we note between 1904 and 1920 they offered, in addition to many diploid varieties, the tetraploids ALCAZAR, AMBASSADEUR, DEJAZET as well as the triploid BALLERINE and pentaploid MAGNIFICA. It does not take a very lengthy search of the ancestry of our iris to notice how many times these iris enter into our garden plants. From these sources we can trace many of our red leads as well as the dark purples and the use of DEJAZET is almost a cornerstone for the blend class. Vilmorin iris are in the Nicholls, Kirkland, Washington and Sass lines as well as in many other breeders' lines. Just a cursory glance at the American Iris Society *Check List* will prove of interest to the statistically minded.

Personally, I do not believe that the achievements of M. Denis are as widely and fully known as they should be. He used *I. richardi* liberally and was so fortunate as to combine several forms of *I. variegata* with *I. richardi* to give us such tetraploids as MADAME DURAND, SUZANNE AUTISSIER, EDITH CAVELL, ANDRE AUTISSIER, RICHARDI BLANC BLEUTE, etc. These varieties have more or less

disappeared from the garden but their blood lines were the latent foundations for the great strains of M. Cayeux, Dr. Loomis and others. M. Millet continued the refinement of the tetraploid *richardi* strain to a more limited extent. His iris SOUVENIR DE LOETITIA MICHAUD, MADAME CECIL BOUSCANT, GERMAINE PERTHUIS, all tetraploid, were widely used and their use in America is noticed in the strains of the iris of Dr. Kleinsorge, Fred De Forest, Col. Nicholls and others.

Messieurs Denis, Vilmorin and Millet were all earlier workers than M. F. Cayeux, whose liberal use of the achievements of his compatriots gave us the Cayeux strain. Cayeux originations that have exerted profound influence on iris breeding include HELIOS, RENE CAYEUX, SENSATION, SERENITE, DÉPUTÉ NOMBLOT, PLURABELLE and JEAN CAYEUX. What breeder has not used JEAN CAYEUX? Dave Hall and Dr. Kleinsorge are just two examples of breeders who have used it liberally. The fame of Cayeux iris is well known and I do not believe it necessary to call attention to the use breeders all over the world have made of his strain. All the iris I have mentioned arose from this same road, diploid crossed with tetraploid.

Very close, if not concurrent with the developments in France, were those of Sir Michael Foster, the dean of iris hybridizers whose great interest in the genus iris was as responsible as that of any single person for the discovery and use of the tetraploid Asiatic species. He gave the world CRUSADER, LADY FOSTER and KASHMIR WHITE. The liberal use of tetraploid *I. cypriana* and *I. trojana* by George Yeld yielded ASIA, LORD OF JUNE, HALO, PROSPERO and Sir Arthur Hort's MIRANDA, REGAN, ANN PAGE. All prove to be the basis of our modern blues along with CRUSADER and that striking break of Cayeux's, SENSATION.

Perhaps one of the greatest triumphs in iris breeding is the work of A. J. Bliss and his achievement in iris DOMINION. It was a tetraploid and its matings with different diploids as well as a few tetraploids then extant gave the famous Dominion race of plants, noteworthy examples being CARDINAL, BRUNO, MRS. VALERY WEST, GRACE STURTEVANT, and SWAZI. The advent of DOMINION and its character of velvety quality is one of the great achievements in the iris world and the Bliss strain of iris was universally sought. It enters into the family trees of iris by the Sasses and Cayeux, to

mention just two. And these famous breeder iris in turn are being used to create the newer iris of tomorrow.

Mention should be made of W. R. Dykes and his monumental iris seedling, W. R. DYKES. It is the common denominator to more of our pure yellow iris than any other single iris. Its parentage has never been disclosed officially, a rather strange thing for a man who studied the genus so assiduously and published that fine volume, *The Genus Iris*, which describes the known iris species of the world.

The American achievements in this development have been as interesting as any phase. Miss Grace Sturtevant really developed a host of wonderful diploid varieties. She did make several diploid crossed tetraploid matings and obtained QUEEN CATERINA, a triploid; ROSE MADDER, a tetraploid, the parent of DAUNTLESS and the red line to come; also CAMELIARD and RAJPUT. Some records are in doubt; otherwise, there probably would be further additions to her list.

Mr. E. B. Williamson's seedling, LENT A. WILLIAMSON, sometimes called the American Dominion, is as potent a factor in the creation of the modern iris as any other. Its parentage is out of tetraploid *I. amas*, an Asiatic tetraploid. Interestingly *I. amas* is also one of the parents of DOMINION. The liberal use of LENT A. WILLIAMSON at Bluffton yielded DOLLY MADISON as well as many other tetraploids, each taking in its germ plasm the colorings of the diploid race and transposing them into the tetraploid race. It has remained for the later breeders to refine, combine and extract latent recessive combinations whose possibilities have merely had surface exploration. The Shull iris MORNING SPLENDOR came from the cross of *I. trojana* \times LENT A. WILLIAMSON.

The third set of pioneers were the Sass brothers. Their work has numerous tetraploid \times diploid lines. One of the most important was the eventual development of KING TUT and its famous child RAMESES. Both are breeders whose importance I believe equals other like breaks such as that of DOMINION or the French breeders' work. Without the color genes of KING TUT and the blending type of inheritance from RAMESES, American iris gardens would look considerably different. It is from this line, too, that an important part of the new tetraploid yellow background plicatas such as SIEGFRIED eventually evolved, although, because plicata is a recessive factor, its inheritance in the tetraploid ratio is considerably less than the simple 3:1 ratio expectancy of diploid recessives.

Our fourth great pioneer unit in America was William Mohr, whose work after his death was continued by Prof. Sydney B. Mitchell. In Mohr's garden his hybrid combination of tetraploid *I. mesopotamica* with diploids gave such tetraploids as ALAMEDA, ESPLENDIDO, CONQUISTADOR and SHASTA, to mention but a few. The use of the diploid plicata PARISIANA laid the groundwork for the later tetraploid plicata race LOS ANGELES, SAN FRANCISCO, etc. Incidentally, some of the Sass blue plicatas as CLARIBEL trace their ancestry back to CONQUISTADOR, which itself was a plicata carrier. In addition to the evolution of the tetraploid plicata work on which Prof. Mitchell collaborated with Mr. Mohr, Prof. Mitchell is responsible for the brilliant work in the development of the new yellows. He is entirely too modest about his own efforts in this respect. He used lines of work Mr. Mohr built up but, what is equally important, he combined the diploid SHEKINAH with the tetraploid ARGENTINA and used this seedling in important breeding work. Prof. Mitchell likewise was the first breeder to evaluate correctly the possibilities of extracting yellow iris out of the red-browns. His first big yellow, ALTA CALIFORNIA, was more important from a pure breeding achievement than later releases. He blazed the way for the subsequent yellows that grace our garden today. His CALIFORNIA GOLD resulted from a cream \times brown to yield the rich yellows.

About the last iris to change from the diploid to the tetraploid have been the yellows. The liberal use of W. R. DYKES crossed with diploids has given numerous fine yellows via this same route—GOLDEN HIND, GOLDEN TREASURE, LUCREZIA BORI and MARY LEE DONAHUE. Once large tetraploid yellows were obtainable, intercrossings and matings with blends gave a whole new series of hybrids, all tetraploid.

The foregoing information covers some of the more important highlights in the transmitting of diploid characters into a new tetraploid race. It is impossible to mention each breeder and his particular contribution. Paul Cook, of Indiana, has done an unusual amount of direct transmission of diploid characters into a tetraploid race entirely in a series of seedlings of his own. To such workers as Mr. Lapham and others we mean no offense in omission of reference to their accomplishments. Space forbids greater length. But for the reader who was interested enough to peruse this article to this length, I am listing parentages of the iris referred to, along with general information as to whether they are diploid, triploid or

tetraploid. A study of the family trees of the modern iris will be interesting to see how and why different iris seedlings are colored as they are and why it is so necessary to raise so many to get a select few that are individual. If genetics of color interests the reader, a study of pigmentation will be an equally interesting chapter.

Included in the parentages are several diploid \times diploid crosses and tetraploid \times tetraploid crosses. These parentages are not generally known and are highly significant in studying family trees. In parentage table below diploid $2n$ 24, $4n$ 48. The basic chromosome number of the tall bearded polyploid series is a multiple of 12.

Tetraploids from $2n \times 4n$

QUEEN CATERINA (QUEEN OF MAY \times CATERINA)
 HELIOS (CLAUDE MONET \times DEESE)
 RENE CAYEUX (BLACK PRINCE \times MONSIGNOR) \times *I. amas*
 SENSATION (LE NEIGE \times RICHARDI BLANC BLEUTE)
 DÉPUTÉ NOMBLOT (FRANCHEVILLE \times BRUNO)
 ALAMEDA (PARISIANA \times ARGENTINA)
 BLACKAMOR (BEAU IDEAL \times ARCHEVEQUE) \times BALDWIN
 DOMINION (CORDELIA \times (*amas-macrantha*)
 ROSE MADDER (HECTOR \times SHELFÖRD CHIEF) \times self

Tetraploids from $4n \times 2n$

EDITH CAVELL (*richardi* \times *dalmatica*)
 RICHARDI BLANC BLEUTE (*richardi* \times *dalmatica*)
 SOUVENIR DE LOETITIA MICHAUD (*richardi* \times *corrida*)
 LADY FOSTER (*cypriana* \times *pallida*)
 BRUNO (DOMINION \times (MAORI \times LEONIDAS)
 MADAME DURANDE (*richardi* \times DARIUS)
 SUZANNE AUTISSIER (ORIFLAMME \times MADAME CHOBER)
 ANDRE AUTISSIER (*richardi* \times *dalmatica*)
 MADAME CECIL BOUSCANT (? \times *richardi*) \times QUEEN OF MAY
 JEAN CAYEUX (PHRYNE \times BRUNO) \times (SUNSET \times MARSH
 MARIGOLD)
 CRUSADER (*cypriana* \times ?)
 WINNESHIEK (RHEIN NIXE \times MADAME GAUDICHAU) \times (PARC
 DE NEUILLY \times ARCHEVEQUE)
 MARY LEE DONAHUE (W. R. DYKES \times PRIMROSE)

Mixed Ancestry

GERMAINE PERTHUIS (MADAME GAUDICHAU \times TROOST)
$4n$ $4n$ $2n$

CAMELIARD (SHELFORD × SARPEDON) × VALKYRIE				
4n				4n
SERENITE (SUNSET × DRYADE) × CLAUDE AUREAU				
4n	2n	4n		4n
PLURABELLE (ELDORADO × GLORIAE) × EVOLUTION				
4n	2n	4n		4n
SACHEM & SHIRVAN (<i>trojana</i> × MRS. NEUBRONER) × BRUNO				
4n	4n	4n	2n	4n
CHIROMYLLA (<i>trojana</i> × MRS. NEUBRONER) × ARGENTINA				
4n	4n	2n		4n
MAGNIFICA (<i>richardi</i> × <i>amas</i>)				
5n	4n	4n		
PHRYNE (MADAME DURANDE × LORD OF JUNE)				
4n	4n			4n
CARDINAL (TROSUPERBA × DOMINION)				
4n	4n	4n		
LENT A. WILLIAMSON (<i>amas</i> × ?)				
4n	4n			
CLAUDE AUREAU (CLAUDE MONET × BRUNO)				
4n	4n	4n		4n
CLAUDE MONET (IRIS KING × IMPERATOR)				
2n	2n	4n		

CONSIDER THE BLUES

MARY F. THARP

■ SO OFTEN we hear a plea for more and better iris in the blue tones and how necessary they are to the garden picture. To date nothing very much has been done about it. A close study of the published ancestry of blue iris up to and including our Registrar's report in BULLETIN No. 92 (February, 1944) leads one to believe that most of our blues—at least those in light to medium tones—are derived from much the same sources, varying somewhat as to whether they are first or second generation. This being true, how can we expect any very great breaks? When we consider how very much overworked PURISSIMA, SHINING WATERS and GLORIOLE are in today's blues, there is little wonder that gardeners are asking for new and better blues.

In our zeal to reach the unattainable—the pure pinks and reds—

I am wondering if we are not overlooking the possibilities of the true blues and the place they have in our iris pictures. From Australia comes the suggestion that our blues be crossed with light yellows to clarify the color, a suggestion worth trying. Several crosses were made in my garden this year following this line of reasoning and I am looking forward to the results. It would be interesting to have a report from anyone who may be trying this type of cross.

From Oregon comes a new blue iris named last year, BLUE CHAMPAGNE (Suiter). The cross was GLORIOLE \times ICE MAIDEN; the result is a much improved GLORIOLE. Gardeners will like this one, especially those who are looking for a non-fading light blue with non-skid standards. After all, GLORIOLE *is still* just SOUV. LOETITIA MICHAUD \times QUEEN CATERINA, and ICE MAIDEN, another non-fading light blue of PURISSIMA \times SANTA BARBARA.

In a group of seedlings last season, a cross of SHINING WATERS and good old reliable DOLLY MADISON (cheers for the substance and beard it transmits to its progeny!) was a medium-blue-toned iris that seemed to have everything but height for the size of blossom. The color tone was very clear and seemed a real blue, no orchid or purplish cast. The plant had been pushed and shoved around for several seasons, and as this was its first chance to stay in one place long enough to blossom, we did not condemn its low stature. I am looking forward eagerly to its blooming this season. The question in my mind now is, shall I cross this with GREAT LAKES, GLORIOLE, EXCLUSIVE, NARADA, LUCERNE, ALINE, ANITA, BLUE HORIZON, MOUNTAIN SKY or perhaps MOUNT WASHINGTON or MATTERHORN? GOLDEN FLEECE, perhaps, or SPUN GOLD? Or shall I just call it a day and let well enough alone?

EMBRYO CULTURE OF IRIS SEED

L. F. RANDOLPH*

■ THE SEED of garden varieties of bearded iris has a period of dormancy which normally persists for at least several months and may extend over a period of several years. In the central and northern United States seed harvested in August and planted in the open ground in seed beds or cold frames ordinarily remains dormant over winter and germinates the following spring, in April and May. In the milder climate of the southern states and California, the seed ripens earlier and if planted within two or three months after it is harvested will germinate in February or March of the following year. Under greenhouse conditions freshly harvested air-dried seed planted in moist soil and maintained at temperatures which are optimum for the growth of most plants rarely germinates in less than four or five months. Under field conditions the seed which fails to germinate the first year remains dormant until the following year, and a certain number of seeds may germinate thereafter at yearly intervals for several years.

First-Year Germination

The proportion of the seed that germinates the first year is extremely variable. Sir Michael Foster reported in 1924 that in his experience extending over many years relatively few seeds germinated the first year, more the second year and a few more at yearly intervals for five to fifteen years. In 1934 Professor Essig reported in the A.I.S. BULLETIN that he had obtained 14,400 seedlings from 36,890 seeds, or 39 per cent germination, during the preceding twelve years. His records included the seed that germinated during both the first and second year after planting. More seedlings ordinarily were obtained by Essig the first year than were produced in the second year, although the reverse was true in certain instances. An average of 35 per cent germination was obtained the first year from 12,459 seeds planted in my garden at Ithaca, N. Y., during the period from 1938 to 1942. This seed was produced by 125 crosses representing various hybrid combinations of garden varieties of tall bearded iris. From 70 to 80 per cent

*Cooperative investigation of the Division of Cereal Crops and Diseases, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration, U. S. Department of Agriculture, and the Department of Botany, New York State College of Agriculture, Cornell University, Ithaca, New York.



The embryo is removed from the seed with a dissecting needle which is sterile.

of the seed obtained from a limited number of crosses germinated the first year. Much lower percentages were obtained from most of the crosses, and not infrequently less than 10 per cent of the seed germinated the first year.¹

Attempts to improve the germination of iris seed by various types of seed treatment thus far have been only moderately successful. Essig found that germination was not improved by chipping the seeds, by pre-chilling them before planting, or by planting the freshly harvested undried seeds. Randolph and Cox improved germination somewhat by subjecting the seed to near-freezing temperatures for several weeks, by chipping the seed to remove the cap of tissue covering the radicle of the germ, by increasing the oxygen pressure of chipped seed, and by leaching both chipped and unchipped seed in running water. But none of these treatments resulted in an average rate of germination that exceeded 64 per cent, although a three-fold increase actually was obtained in some of these tests since only 15 to 20 per cent of the untreated seed used in these experiments germinated.

Alternating low and moderate temperatures were no more effective than continuous low temperature in inducing germination. Varying the acidity or alkalinity of the medium in which the seeds were germinated within the range of pH 4.1 to 8.5 had no significant effect on germination, and beneficial results were not pro-

¹See RANDOLPH, L. F., and LELAND G. COX, *Proc. Amer. Soc. Hort. Science*, 43:234-300, 1943, for an account of various attempts to improve the germination of iris seed, and the application of the excised embryo technique to the production of iris seedlings.

duced by exposing the seeds to sunlight during the drying of the freshly harvested seed or for several weeks after planting in the seed bed without the usual covering of soil. The most effective treatment involved the leaching in running water of chipped seeds that had been prechilled at near-freezing temperatures for several weeks, the seeds being transferred from the water to soil as soon as they germinated.

Seed Dormancy

Iris seed remains dormant under a variety of conditions which not infrequently are effective in breaking the dormancy of other seeds. It may retain its viability in the soil for many years, and the dry seed is capable of germinating after having been stored at room temperature for at least twelve years.



Apparatus and glassware pictured here were used in embryo culture of iris. Culture bottles are filled with nutrient medium (left) and preparations are made for transfer of embryos from seed to culture bottles.

That the dormancy of iris seed is not due to a dormant condition of the embryo itself was demonstrated in experiments in which the embryos were removed from the seed under aseptic conditions and cultured on sterile nutrient agar. In this new environment the excised embryos begin to grow almost immediately and within a few days produce normal, healthy seedlings. This embryo culture technique may be utilized to obtain seedlings either from freshly harvested or air-dried seed, and with refinements of the original technique that are now available, seedlings may be produced from a very high proportion of the seeds that contain viable embryos.

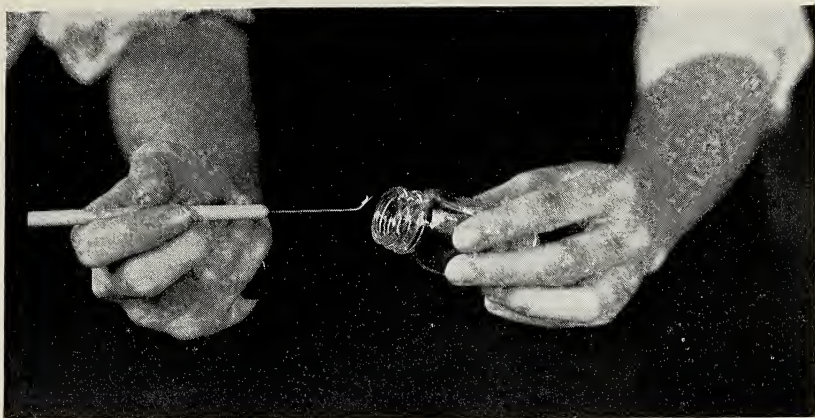
In recent years the embryo culture technique has become a standard procedure for obtaining seedlings from seeds that are difficult or impossible to germinate, or that fail to reach maturity. It was first employed for this purpose in Germany approximately 40 years ago by Hannig and later by Dietrich and Laibach.² Werkmeister, another German scientist, utilized the method in 1936 to obtain iris seedlings from seeds with either normal or imperfectly developed endosperm.³ In this country Tukey was the first to employ the embryo culture technique on an extensive scale, in the production of sweet cherry seedlings.⁴ Since the publication of Tukey's experiments in 1933, numerous workers have demonstrated the usefulness of the excised embryo technique in the study of various physiological, cytological and genetical problems. At the present time it is very generally recognized as a valuable aid to the plant breeder as well as a standard procedure in the analysis of the causes of dormancy in seeds.

The procedure for culturing iris embryos described by Randolph and Cox in 1943 has been modified appreciably during an additional two years of experimentation, the primary objective being the development of a simple, reliable method requiring a minimum of special apparatus or facilities not readily available to iris breeders. By utilizing suitable germicidal solutions in the process of removing the embryos from the seed it was possible to dispense with the special chambers and transfer rooms ordinarily employed in similar operations. In the earlier experiments, after the seedlings were transferred from the culture bottles to the soil, losses sometimes resulted from pathogenic fungi which caused damping-

²LAIBACH, F. *Zeitschr. f. Botanik* 17:417-459, 1925.

³WERKMEISTER, P. *Gartenbauwiss.* 10:500-520, 1936.

⁴TUKEY, H. B. *Journ. Heredity* 24:7-12, 1933.



An excised embryo is transferred to a sterile culture bottle.

off of the young seedlings.⁵ A method of growing the seedlings has now been perfected that practically eliminate losses due to seedling diseases.

The embryo culture technique involves simply the transfer of the embryos from the seed to culture bottles containing sterile nutrient agar. Under conditions favorable for growth, the embryo soon begins to enlarge and within two or three weeks is transformed into a seedling with well developed roots and leaves. It is then transplanted to soil and grown to maturity in the usual manner. The essential steps are few in number and relatively easy to perform, but the manner in which they are performed is very important if the operation is to be successful. The following directions for culturing the embryos and growing the young seedlings of iris were prepared in sufficient detail to enable persons unfamiliar with pure culture methods to utilize the embryo culture technique for the production of iris seedlings.

The Transfer Room

Any well lighted room reasonably free of the spores of molds and bacteria is suitable for the transfer of the embryos from the seed to the culture bottles. The use of germicidal solutions recommended in the following procedure obviates the need for the special

⁵I am much indebted to the late Professor H. H. Whetzel and Mr. J. S. Niederhauser for the identification of the pathogenic fungi, *Rhizopus*, *Fusarium* and *Pythium* that caused the damping-off of the iris seedlings, and for the confirmatory tests of their pathogenicity.

transfer rooms, chambers or hoods equipped with special devices for sterilizing the air that ordinarily are recommended for pure culture work. Daylight illumination and comfortable working conditions increase the efficiency of the operator and facilitate the culturing of embryos.

It is necessary only that the transfer room be reasonably free of air currents laden with the spores of microorganisms of the sort that thrive on the nutrient medium. The possibility of contaminations from air-borne spores may be reduced appreciably by spraying the table and walls of the room with a one per cent aqueous solution of phenol (carbolic acid) to which a few drops of an aerosol or wetting agent such as turgitol have been added for each 100 milliliters of solution. Air filters of the type used in air-conditioning units also are useful in excluding air-borne contaminants.

Preparation of Nutrient Culture Medium

It is convenient to combine most of the various ingredients of the culture medium in two concentrated stock solutions from which the desired quantity of nutrient solution may be prepared as needed. The two solutions, A and B, combine these ingredients:

Solution A

Calcium Nitrate — $\text{Ca}(\text{NO}_3)_2 \cdot 4\text{H}_2\text{O}$	23.6 gms.
Potassium Nitrate — KNO_3	8.5 “
Potassium Chloride — KCl	6.5 “
Distilled Water	500 ml.

Solution B

Ferrous Sulfate — $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$	0.2 gms.
Calgon — $(\text{NaPO}_3)_n$	1.0 “
Magnesium Sulfate — $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$	3.6 “
Distilled Water	500 ml.

The salts comprising solution A are readily soluble in water and form a solution that is stable at ordinary temperatures. Solution B is prepared by dissolving the ferrous sulfate and magnesium sulfate in 250 milliliters of distilled water. The Calgon is dissolved separately in 250 milliliters of distilled water and the two solutions are then combined. If either the Calgon or ferrous sulfate is added to an aqueous solution of the other salt an insoluble precipitate is formed. Solution B ordinarily is stable at room temperature but as a precaution against the formation of an insoluble precipitate of iron phosphate it should be stored in a refrigerator at near-freezing temperatures. Chemicals of C. P. grade should be used in making up these solutions. With the exception of Calgon, which



Culture bottles contain a sterile ungerminated iris seed (left) and seedlings aged six to ten days, developed from the embryos which have been excised.

is the trade name of a sodium hexametaphosphate product manufactured by Calgon, Inc., Pittsburgh, Pa., they are readily obtainable from chemical supply houses. Calgon forms a soluble complex with both iron and calcium which remains in solution indefinitely and produces a clear nutrient agar more satisfactory for the growth of iris seedlings than other nutrient media ordinarily used for similar purposes. It eliminates the difficulty of retaining in solution the small amount of iron necessary for optimum growth.

The nutrient medium to be used for culturing the embryos is prepared by heating seven grams of agar with one liter of distilled water (ordinary tap water may be used if it is not too heavily laden with chemical purificants) until it is completely dispersed. To this is added 20 grams of sucrose (ordinary table sugar) and 5 milliliters of each of the stock solutions A and B. The amount of agar recommended is just sufficient to cause the culture solution, when cooled to room temperature, to form a solid medium having the consistency of soft gelatine. The hot mixture is distributed to culture bottles and after being sterilized and allowed to cool is ready for use. A funnel and clamp arrangement convenient for distributing the hot nutrient solution to the culture bottles is illustrated in the accompanying photograph.

A convenient type of culture bottle is the one-ounce, screw-cap bottle shown in the photograph. This particular bottle is manufactured by the Armstrong Cork Company, Lancaster, Pa., but any wide-mouthed, screw-cap bottle of approximately this size would be suitable. Various types of caps are available for these bottles, the most satisfactory in our experience being a black phenol formaldehyde plastic cap. Metal caps tend to rust following repeated steam sterilization, but the plastic caps may be used repeatedly after being boiled in a strong soap solution to prevent leaching during steam sterilization of substances injurious to the embryos.

The bottles should be filled with the hot culture solution to a depth of approximately one-half inch. A liter of solution is sufficient for approximately 125 one-ounce bottles. The culture solution should not be allowed to come in contact with the neck of the bottle; if it does, contaminations may result. After the solution has been placed in the bottles they are capped and then sterilized in an autoclave or pressure cooker at fifteen pounds pressure for 20 minutes. The caps should not be screwed down tightly until the bottles have been sterilized and permitted to cool. After removal from the sterilizer the bottles should be protected from air currents with a covering of paper to prevent excessive condensation of water on the inner surface of the bottles as they cool. They may be stored for several weeks or longer until ready for use if they are protected from dust and excessive evaporation of the agar medium.

Excision of the Embryo

The dry seed should be surface sterilized for one to two hours in a concentrated aqueous solution of calcium hypochlorite, to each 20 to 30 milliliters of which a drop or two of a wetting agent such as turgitol has been added. The commercial bleaching agent, Chlorox, diluted with approximately an equal volume of water, also may be used for sterilizing the seed. After they have been surface sterilized the seeds are soaked in sterile or boiled water, changing the water daily for 3 to 5 days to soften the endosperm of the seed and facilitate the removal of the embryo. Freshly harvested seeds removed from ripe capsules before they begin to open do not need to be sterilized and ordinarily require no preliminary soaking in water. If the dry seeds are not surface sterilized and are soaked in unsterilized tap water, bacteria may enter the seeds while they are being soaked in the water and become associated with the embryos, thus causing contaminations when the embryos are trans-



These iris seedlings, from one to three months old, were grown from excised seedlings.

ferred to the sterile culture medium. Iris embryos rarely survive more than a few days on culture media in the presence of these bacteria.⁶

The soaked seeds are then immersed in a solution of 50 per cent alcohol in preparation for the removal of the embryos. As the

⁶Kindly identified by Professors J. M. Sherman and C. F. Niven as *Erwinia* and *Xanthomonas* (*Phytomonas*).

embryos are being removed the razor blade used in opening the seed and the fingers of the operator that come in contact with the seed should be dipped frequently in the alcohol solution, the germicidal properties of which are effective in reducing contaminations. Immersion in 50 per cent alcohol for longer than three to four hours is injurious to the embryos of intact seed and the alcohol should not be permitted to come in direct contact with the embryos for any appreciable length of time. The materials used in the excision of the embryos are illustrated in the accompanying figure. The excision of the embryo is achieved in the following manner. A longitudinal cut is made in the seed directly toward, but not quite to, the central region occupied by the embryo. In making the cut it should be started near the hilum and extended backward and around the seed to the opposite side. The seed may then be separated in approximately equal halves, exposing the embryo, as indicated in the figure which shows the embryo being removed with a bent dissecting needle.

Before removing the embryo from the seed the needle is dipped in 95 per cent alcohol, flamed with a single passage through the flame of an alcohol lamp, then dipped in a hexylresorcinol solution, S.T. 37, diluted with an equal volume of water. This antiseptic solution, prepared by Sharp and Dohme, Philadelphia, Pa., and commonly available at drug stores, is non-toxic to the iris embryos and as an aid in handling them has proved to be an effective germicide. Also, the embryos adhere to the moist needle more readily than they do to a dry needle. The use of 95 per cent alcohol and flaming to sterilize the needle, in addition to the use of the hexylresorcinol solution, is chiefly precautionary. If the needle is merely dipped in the hexylresorcinol solution few contaminations ordinarily result, unless resistant spores are present that are not killed by contact with the hexylresorcinol.

In transferring the embryos to the culture bottle, it is advisable to hold the bottle in a horizontal position to prevent the entrance of air-borne contaminations while the cap is removed and the embryo is planted on the surface of the agar. After the embryos have been placed in the bottle the cap should be screwed down firmly, but not too tightly, as an exchange of air within the bottle is essential for the growth of the seedling. Ordinarily two seedlings are placed in each bottle. If one becomes diseased or a contamination

develops on the surface of the agar the unaffected embryo may be transferred to a fresh culture bottle.

Embryo and Seedling Culture

The embryos are cultured first in darkness at a temperature of 28 to 30 degrees Centigrade (82 to 86 degrees Fahrenheit) for three to five days, and then transferred to weak daylight or artificial light equivalent in intensity to the light from a north window, for an additional three to five days. Thereafter, the culture bottles containing the young seedlings should be transferred to the stronger light of a shaded greenhouse or cold frame from which direct sunlight is excluded and in which a temperature ranging from about 65 to 85 degrees Fahrenheit is maintained. Within two or three weeks after the embryos are planted in the bottles the young seedlings ordinarily have well developed roots and at least two or three seedling leaves. They are then ready to be transplanted from the bottles to soil.

After the young seedlings have been transferred from the culture bottles to soil, either in flats or in seedling beds, they should be protected from sunlight and rapid evaporation for several days. A layer of sifted sphagnum peat approximately an inch in depth is distributed over the surface of the soil in which the seedlings are to be planted, to conserve moisture and inhibit the growth of pathogenic microorganisms. This is important, and neither soil nor fertilizer should be mixed with this surface layer of peat, or it may no longer protect the seedlings from injury by pathogenic organisms. After the seedlings have become established in the soil they may be handled in the same manner as ordinary seedlings that have been grown directly from seed.

Iris seedlings produced from excised embryos make excellent growth under greenhouse conditions during the winter months at Ithaca, N. Y. In this latitude night temperatures of 60 to 65 degrees and day temperatures of 65 to 75 degrees Fahrenheit are most favorable for normal seedling growth, and supplemental lighting is not required, either to increase the intensity of daylight illumination or to extend the photoperiod.

If greenhouse facilities are not available for growing the seedlings during the winter months, the seed may be stored over winter and the embryos cultured in the early spring when the seedlings may be grown in cold frames and then transplanted directly to

the garden. The embryos of seed that has been in dry storage for a period of months or even years may be cultured as successfully as the embryos of freshly harvested seed. In fact vigorous, healthy seedlings have been obtained by culturing the embryos of seed that had been stored at room temperature for twelve years.

The procedure outlined above for culturing the embryos and seedlings of iris is the result of numerous tests to determine the optimum conditions for the growth of the excised embryos and young plants. Four years of experimentation were involved. Seedlings produced by this method from seed harvested in 1941 were grown to maturity under field conditions for the first time in the summer of 1942. During the next year embryos were again cultured from seed that ripened in August, 1942. The seedlings were grown in the greenhouse during the following winter and in May, 1943, they were transplanted to the garden. During the next two months, 46 of the 152 seedlings in this group bloomed for the first time. Thus the cycle from seed to flowering was reduced to less than one year, in contrast to the two or three years normally required to obtain bloom. In 1944 approximately 1,200 seedlings were grown from embryos cultured in the fall of 1943, and in 1945 more than 3,000 seedlings are being grown from excised embryos of seed harvested in the summer of 1944. Tests are now in progress to determine the conditions under which the seedlings should be grown in order to obtain bloom from a higher proportion of the plants the first year.

The embryo culture technique should be especially useful in iris breeding. The possibility of obtaining successive generations of iris at yearly intervals provides an opportunity for more rapid progress in the development of new varieties. Such advantages will not be overlooked by the enthusiastic hybridizer. I recall very vividly receiving from Colonel Nicholls in the fall of 1942 a seed pod of the Dykes Medal winner, PRAIRIE SUNSET, of Hans Sass, with the suggestion that the embryos of this seed be cultured, and will long remember the keen interest with which we examined the bloom of its seedlings the following summer.

Of perhaps even greater significance is the fact that there is now available a reliable procedure for obtaining seedlings from crosses that are difficult to make, that produce few viable seeds, or seeds that under ordinary conditions germinate very poorly or not at all. Many of the most important varieties of iris from the breeding

standpoint originated from such crosses. For example, the famous variety DOMINION came from a seed pod containing but a single seed. The germination of that particular seed was indeed a very fortunate coincidence.

In the same category belong such crosses as those between the older European diploid varieties and the Asiatic tetraploids from which originated many of the progenitors of our modern tetraploid tall bearded iris. In attempting to repeat crosses of this type most of the pollinations that were made failed to set seed; a few seeds were obtained occasionally, but when planted in the seed beds in the usual manner these seeds rarely germinated. Similarly, the true intermediate iris, which are hybrids between the prolific, early-blooming dwarfs and the later-blooming tall bearded sorts, are highly self-sterile, and these hybrids produce relatively few seeds when back-crossed to either plant. Other examples of important breeding stocks that rarely produce germinable seed include the oncopogon hybrid WILLIAM MOHR and its first generation hybrids with pogon varieties, such as ORMOHR, ELMOHR and MOHRSON. These varieties are relatively infertile, and the same is true of certain triploid varieties of tall bearded iris such as SAN GABRIEL and FRIEDA MOHR. These are but a few of the many examples that might be cited of hybrids from which it would be highly desirable to obtain seedlings more readily than is possible by germinating the seed in the usual manner. By utilizing the embryo culture technique, this can now be accomplished with a high degree of success.

These experiments on embryo culture and the germination of iris seed resulted from the recognition of the need for an effective method of breaking the dormancy of the seed and obtaining bloom from the seedlings in a shorter period of time than is possible when the seeds are germinated in the usual manner. It seemed especially desirable to obtain a higher per cent of germination from crosses that were difficult to make or that produced few viable seed. These objectives have been realized. Undoubtedly, future experience will suggest various modifications of the embryo culture technique, but in its present form it is a practical and reliable method of speeding seedling production in iris, and removing the uncertainty and delay caused by the prolonged dormancy of the seed.

OUR MEMBERS WRITE

Experiments with Seed Germination

■ PERHAPS my experience with iris seed during the past 12 months may interest members of the A. I. S.

Last year in Berkeley, I contacted a Mr. Cliff, who was germinating iris seeds at will by removing the cap over the radical at the stem end, putting the seed to bed in damp peat moss at 40 to 50 degrees F., if possible, until the radical showed growth and then planting it. This was a startling procedure because onco seeds germinate scatteringly over a period of many years.

My seeds, both pogon and onco, germinate in the ground from October to April, never later, and mainly in January and February.

When I came home in May, I soaked seeds that had not germinated, had them decapped, which is a delicate operation as the radical must not be injured, and tried out the method with both onco and pogon seed.

The germination was surprisingly good but the summer growth was not worth while, although it was better in the pogon.

I puttered all during the summer with this method of getting seedlings. Germination was easy but getting seedlings was not so successful as at first.

In November I dug some eleven seeds (LADY MOHR on onco) which were of special interest and gave them the treatment and planted them with a layer of screened sphagnum moss about the seeds.

At the present time (April), there are eight healthy plants well up. This, to me, is very satisfactory indeed.

—C. G. WHITE

Redlands, Calif.

News from Italy

(Excerpt from a letter by Mrs. Henry E. Montgomery, Tuxedo Park, N. Y., about her sister Countess Mary Senni, Grottaferrata, Italy)

■ “MY SISTER left her house last February and moved into Rome the day the Germans came to take possession of it. Followed four successive occupations by Germans, Tunisians, British and Americans. The garden suffered untold damages, being overrun by tanks and heavy army equipment. Many bombs fell thereabouts as we

tried to put out of action the 'Anzio Express'—a train carrying huge German guns which fired on our troops at night. In the day time the train was hidden in a railroad tunnel that runs through my sister's property. We never succeeded in putting the train out of action—though it was broadcast that we had—and the Germans were able to take it away when they retreated.

"My sister is now back in her house. She writes that among the few plants left are her seedling iris, but all labels are gone. She has asked me to send her iris catalogs so that she may see what new kinds have been created in the three years she has been cut off from the outside world."

Proposes New Calendar for Awards

■ MR. EDWARD WATKINS is mistaken in claiming (in BULLETIN No. 96, page 62) that PURISSIMA is 100 per cent female. It has potent pollen occasionally—I have had seedlings from it. It is predominantly female, however.

The suggestions of Mr. David Platt in his article, "Why Not Move Up the Awards?" also in BULLETIN No. 96, are, in my opinion, not entirely sound. A limit of one introduction a year would not clean up the introductions of small breeders, which most breeders are. But I think what would happen would be a flood of unregistered introductions and duplicate names — a situation that could be worse. I know how hard Mr. Gersdorff worked to bring general registration and order.

Mr. Platt's calendar for the Dykes Medal seems a year too short. As I figure it, it should be: 1945—seedling; 1946—confirmation of value and enough to stock and distribute (if lucky); 1948—H. M. on a two-year clump; 1949—A. M. and Dykes.

Experience makes a strong case against hurry. I am thinking of ELMOHR. Here the date of registration means nothing. Because of Dr. Loomis' generosity, there was wide distribution of this iris before it was registered. If memory serves me correctly, I had it two years before and it was proclaimed before that time. So instead of being up for honor in three years, it was really the usual length of time. To me, the fact that the medal is not a cash reward to the grower or introducer makes for fairness.

C. G. WHITE

Redlands, Calif.

REPORT OF THE REGISTRAR

CHAS. E. F. GERSDORFF AND MRS. WALTER COLQUITT

See *Check List 1939* for explanations of abbreviations and BULLETIN No. 63: pages 78-80, October 1936 for registration rules, one of which has been revised to read, "The closing date, etc. is October 30. Any received after that date will be treated as registrations of the following year; a recess from action on requests will last from July 5 to September 5."

In view of the confusion in the past over Louisiana Iris, the directors have ruled that any COLLECTED varieties from that region submitted for registration from 1945 onward would have to be checked and approved by the Mary Swords Debaillon Iris Society of Louisiana before they may be registered by this Society, subject to our other rules.

ADDITIONS TO, AND CORRECTIONS OF, LIST OF BREEDERS, ETC.

- Allen. Robert E. Allen (1898-); main Ave., Toronto, Ont., Canada (iris breeder).
San Gabriel, Calif.; Aurora, W. Va., and White Plains, N. Y.; iris student; engineer and geologist, horticulture avocation.
- Bailey-A. Mr. Arthur Bailey, C.C., (1870-), Monroe, Wash. (iris breeder).
- Bartlett-E. Mrs. S. L. (Eva L.) Bartlett, 310 Melrose Ave., Toronto, Ont., Canada; iris breeder, and introducer of originations of the late Rev. S. L. Bartlett, who was an iris and gladiolus fancier.
- Bech. Mr. and Mrs. Jos. C. Becherer, (Jos. C. 1872-) and (Anna M. 1879-) (iris breeders); (Jos. C. formerly with Nichol Seed Co., then Mo. Bot. Gard., with florists, finally landscaping and perennial plant business for himself); 4809 Hamburg Ave., St. Louis, Mo. (revision).
- Broddy. Ruth M. Broddy (Mrs. C. B.); (1899-), 185 St. Ger-
- Fass. Peter J. Fass (1904-); 85-30 241 St., Bellrose, L. I., N. Y. (iris breeder).
- Faught. Miss Eva Faught (1888-), Carbondale, Ill. (iris breeder).
- Fitzpatrick. Mrs. F. W. Fitzpatrick (breeder), 4366 Swift Ave., San Diego, Calif.
- Fletcher. Mr. F. L. Fletcher (1903-); (iris breeder); P. O. Box 1185, Rossland, B. C., Canada.
- Gilpin. Mr. D. M. Gilpin (1886-); (iris breeder), 3920 Main St., Vancouver, Wash.
- Loth. Gard. The Lena Lothrop Garden, 1595 Glasgow Ave., San Bernardino, Cal. (irises and daffodils, 1944-).
- Marx. Walter Marx (1908-), Route 2, Box 11, Boring, Ore. (iris breeder for ten years before first registration).

Muhle. Tell Muhlestein, 691 East 8th North, Provo, Utah (iris grower).

Nash. T. P. Nash, Jr. (1890-), Prof. of Chemistry, Dean of School of Biological Sciences, University of Tennessee, College of Medicine, Memphis, Tenn. (iris breeder).

Nelson-I. Mr. Ira S. Nelson, Lafayette, Louisiana; (Prof. of Horticulture at Southwestern Louisiana Institute (plant collector)).

Randolph. Mrs. Robert Lee Randolph (deceased, iris breeder). Mrs. John F. Kerper, owner and registrant, R. D. # 1, Box A-158, Pineville, La.

Ray. Mable (Mrs. S. W.). Lone Oak Gardens, 2271 Lipscomb St., Ft. Worth 4, Texas.

Riggs. Mr. Edmond Riggs (1902-), St. Martinsville, La.

Riggs-Mrs. Mrs. Edmond Riggs, St. Martinsville, La.

Roberts-Mrs. Mrs. Charles F. Roberts, 226 Forest Ave., Norfolk, Va. (iris breeder).

Rogers-Johnson. Ralph Rogers, 3219 Thompson Ave., Alameda, Calif. (iris breeder) and Harold I. Johnson, 172 Austin Ave., Atherton, Calif. (selector and registrant).

Sapp. Mrs. J. A. Sapp, 2319 Penn Ave., Joplin, Mo. (iris breeder).

Shreveport. The Shreveport Iris Society, Shreveport, Louisiana.

Suiter. Mrs. Glen Suiter (1906-); R. #2, Nyssa, Ore. (iris breeder).

Whiting-Ray. Mrs. C. C. Shiting, Mapleton, Iowa (breeder), and Mrs. S. W. Ray (selector and registrant), Ft. Worth 4, Texas.

REGISTRATIONS, APPROVALS, UNAPPROVED, UNDER INVESTIGATION, CORRECTIONS AND SYNONYMS FOR 1944

ACE HIGH. TB-M-Y4D (Lyell N.); R., 1944; (CALIFORNIA GOLD × HAPPY DAYS); □.

ADIRONDACK CHIEF. TB-E-LaM-R4L (Smith-K. N.); R., 1944; (MATULA × ORANGE GLOW); #4-5.

*ADORABLE. TB-M-WW (Gers., N.); R., 1943; etc.

ADVENTURE. Etc.; (Grant 1941); etc.; H.M., A. I. S. 1943; A. I. S. Bull. 90: 4 July 1943.

AIRY FAIRY. TB-E-W1 (Bommers. 1943); R., 1944; (SAN FRANCISCO × VENUS DE MILO); □ none.

ALBANY. TB-La-W6M rev. (Allen, R.E. N.); R., 1944; (LOUVOIS) × (GUDRUN × TIFFANY); □ sl.

ALBA SUPERBA. Etc.; (Sass-J. 1943); etc.; H.M., A. I. S. 1943; A. I. S. Bull. 90: 4 July 1943.

ALBEMARLE. TB-VLa-W9M (Allen-R.E. N.); R.; 1944; (ALLUMEUSE × CITY OF LINCOLN); □ sl.

ALBERTA. TB-EM-W3L (Allen-R.E. N.); R., 1944; ((LOS ANGELES × GLORIOLE) × (SNOW FLURRY)); □ strong pallida.

ALPINE GLOW. TB-La-B7L (Klein. N.); R., 1944; (MEXICO × R Sdlg. #296); #332; □.

ALVA GAGE. TB-EE-Y1M (Gage N.); R., 1944; (W. R. DYKES × NARANJA); □ sl; #6-50-L2.

AMANDINE. TB-La-W4 (Douglas-G. N.); R., 1944; (WHITE

- PRINCE × CAROLINE BURR); #43-11; □.
- AMETHYST TWILIGHT. TB-M-La-S7D (Tharp N.); R., 1944; (MIST O'ROSE × JEAN CAYEUX); □.
- AMITY. TB-M-La-W2L (Corey N.); R., 1944; ((SENSATION × LOS ANGELES) × (WAMBLISKA × SAN FRANCISCO)); □.
- Angeles.** Vestal 1943; ANGELUS.
- ANGELINA FROOD. TB-E-Y9L (Douglas-M.E. N.); R., 1944; (ALICE HARDING × AT DAWN-ING); □ sw.
- ANNE NEWHARD. Etc.; (Wiesner 1940); etc. H.M., A. I. S. 1944; A. I. S. Bull. 94: 3. August 1944.
- *ARGOSY. TB-M-Y6M rev. (Gers. N.); R., 1934; etc.
- ARGOSY. TB-M-Y9D (Stevens-W.R. N.); R., 1944; (GOLDEN HIND × BEOWULF); #1/P59.
- AUDUBON. TB-M-S4M (Faught N.); R., 1944; (Yellow Sdlg. × CALIFORNIA GOLD).
- AUTUMN SPLENDOUR. TB-M-S4M (Stevens-W.R. N.); R., 1944; (POMPADOUR × AIDA); #3/R37.
- AZALEA. TB-M-R4L (Nes. 1944); (MELITZA × LEILANI); #42-2A; □; H. C., A. I. S. 1944; A. I. C. Bull. 94: 4-14-24. August 1944.
- BABS. TB-M-B7D (Loth. N.); R., 1944; (Sdlg. × Sdlg. E.M.#4).
- *BANDMASTER. Etc.; (Hall-D. N.); etc.; R., 1939, etc.
- BANDMASTER. TB-M-B1M (Hall-D. 1944).; Hall-D. 1944; R., 1944; (B Sdlg. × GREAT LAKES); #41-40; H.C., A. I. S. 1943; A. I. S. Bull. 90: 5. July 1943. H.M., A. I. S. 1944; A. I. S. Bull. 94: 4. August 1944.
- BARBRA ADAMS. TB-M-B7D (Cahoon N.); R., 1944; (((Sdlg. × PURISSIMA) × (DYMIA)) × (BRUNHILDE)); #41-6-1; □ sl.
- BAYOU DE NEIGE. Vinic-R1L (Coll. wild, Riggs 1939); R., 1944.
- BAYOU TECHE. Vinic-WW (Coll. wild, Riggs 1940); R., 1944.
- BERKELEY GOLD. Etc.; (Salb. 1942); etc. H.M., A. I. S. 1944; A. I. S. Bull. 94: 3. August 1944.
- Bertha Gersdorf.** National 1944; BERTHA GERSDORFF.
- Betelguese.** National 1944; BETELGEUSE.
- BINGO. TB-La-B9D (Bommers. 1940); R., 1944; (WASATCH × AMALIA); □ ho.
- BIRDIE. TB-La-W9D (Bommers. 1939); R., 1944; (MARY WILLIAMSON × MILDRED PRESBY).
- BISQUE. TB-M-La-Y8L (Dolman N.); R., 1944; (RAMESES × MACAROON); #272; □.
- BLACK FOREST. TB-M-La-B1D (Schreiner-R. N.); R., 1944; □ sl.
- BLACK HAWK. Etc.; (Schreiner-R. 1941); etc.; A.M., A. I. S. 1943; A. I. S. Bull. 90: 3. July 1943.
- BLACKIE. TB-La-B7D (Bommers. 1939); R., 1944; (THURATUS × THE BLACK DOUGLAS); □ none.
- BLACK MAJESTY. TB-EM-B1D (Douglas-M.E. N.); R., 1944; (CAMELIARD × BLACK WINGS); □ sw.
- BLAUVELT. TB-M-B1M (Cassebeer N.); R., 1944; (CYBELE × GREAT LAKES); #70.
- BLENDIA. TB-M-S7M (Wareham N.); R., 1944; (from Sdls. derived from *trojana* and DOMINION); □ sw.; #44-S-1.
- BLEU A CREP. TB-La-B3D

- (Bommers. 1939); R., 1944; (LEGEND × KING TUT); □ cin.
- BLUE CHAMPAGNE.** TB-M-B1L (Suiter N.); R., 1944; (GLORIOLE × ICE MAIDEN); □.
- BLUE CLAY.** TB-M-B1L (Dysart 1944); Loth. Gard. 1944; R., 1944; (SHINING WATERS × SIERRA BLUE); □ pl.
- BLUE FRILLS.** TB-M-B1D (Stephen. N.); R., 1944; (ALINE × MISSOURI).
- BLUE SHIMMER.** Etc.; (Sass-J. 1941); etc.; A.M., A. I. S. 1944; A. I. S. Bull. 94: 3. August 1944.
- Blue Shimmers.** Salb. 1943. **BLUE SHIMMER.**
- BLUE TRIDENT.** TB-VLa-B3M (Berry N.); R., 1944; (((SOUV. DE MME. GAUDICHAU) × (sib. × ORIZABA)) × (ACROPOLIS × SIR MICHAEL)); #32-95-25; □ good.
- BONA FIDES.** TB-EM-W3D (Douglas-M.E. N.); R., 1944; (AMIGO × CANTABILE); □ sl.
- BONNE-NOUVELLE.** Vinie-B1L (Riggs 1944); R., 1944, (natural hybrid in colony of natives).
- BRIDAL MORN.** TB-M-WW (Tobie N.); R., 1944; (COVELLY × GUDRUN).
- BRIGHT MELODY.** Etc.; (Snyder 1941); etc.; H.M., A. I. S. 1943; A. I. S. Bull. 90: 4. July 1943.
- BROOK KERITH.** TB-EM-WW (Douglas-M.E. N.); R., 1944; (ALICE HARDING × SHINING WATERS).
- BRONZE LULLABY.** TB-E-M-S1M (Tharp N.); R., 1944; (DUCHESS OF MAIN STREET × HAPPY DAYS).
- BROWN BEAUTY.** TB-M-S6M (Fitzpatrick N.); R., 1944; (CALIFORNIA GOLD × GOLDEN MADONNA).
- BROWN BUTTERFLY.** TB-M-S4M (Tobie N.); R., 1944; (ABALONE × JEAN CAYEUX).
- BROWN DANCER.** TB-M-S6D (Nes. N.); R., 1944; (SAMOVAR × DAYBREAK); #42-58A; □ none.
- BROWN THRASHER.** Etc.; (Kirk. 1941); etc.; A.M., A. I. S. 1943; A. I. S. Bull. 90: 3. July 1943.
- BRYCE CANYON.** TB-La-Y9M (Klein. 1944); Cooley 1944; R., 1944; (Y Sdlg. #245 × E. B. WILLIAMSON); □ sl.
- Buchleys Giant.** Amity Gardens 1944; **BUECHLEY GIANT.**
- BUNKER HILL.** TB-M-S9M (Tobie N.); R., 1944; (ROSY WINGS × LIGHTHOUSE).
- BURNELL.** TB-M-B1L (Bommers. 1943); R., 1944; (EL CAPITAN × LOS ANGELES); □ cin.
- CAHITA.** TB-M-R6D (Gage 1943); R., 1944; □ none.
- Camilina.** National 1944; **CAMELINA.**
- CAPE BON.** TB-M-R4D (Tompkins N.); R., 1943; etc.; #43-30; H.C., A. I. S. 1943; A. I. S. Bull. 90: 5. July 1943.
- CAPTAIN WELLS.** Etc.; (Cook 1941); etc.; A.M., A. I. S. 1943; A. I. S. Bull. 90: 3. July 1943.
- CASA MORENA.** Etc.; (DeForest 1941); etc., H.M., A. I. S. 1944; A. I. S. Bull. 94: 3. August 1944.
- CASCADE SPLENDOR.** TB-La-S7L (Klein. N.); R., 1944; (MEXICO × GOLDBEATER); #339; □.
- CATHEDRAL BLUE.** Vinie-S1D (Dormon-C. N.); R., 1944; (Coll. in La.).
- CHAMOIS.** TB-M-S4L (Klein. 1944); Cooley 1944; R., 1944; (MEXICO × TOBACCO ROAD); #317A; □.

- CHAVANON. TB-M-La-R7M (Caldwell N.); R., 1944; (PRAIRIE SUNSET × SEQUATCHIE); #51-44C; □ sl.
- CHERRY LUSKA. TD-M-R7D (Dolman N.); R., 1944; (CHERRY ICE × JUNALUSKA); #243; □.
- CHIARA. TB-E-S4M (DeForest N.); R., 1944; (SALAR × PRAIRIE SUNSET); □ sl.
- CHIEF SOLANO. TB-M-Y9L (Barnewitz N.); R., 1944; (MARQUITA × PINK OPAL); □ lilac.
- CHIVALRY. Etc.; (Wills 1943); etc., H.M., A. I. S. 1944; A. I. S. Bull. 94: 3. August 1944.
- C. H. JENKS. TB-EM-R9D (Bailey-A. N.); R., 1944; (AMBASSADEUR × TOKEN); □ none.
- CLIQUEOT. TB-La-S4L (Corey N.); R., 1944; (SHIRVAN × MARY GEDDES) × (CHIEF SEATTLE); □.
- CLOUD CASTLE. Etc.; (Graves 1940); etc. H.M., A. I. S. 1944; A. I. S. Bull. 94: 3. August 1944.
- COLORATURA. TB-M-S7L (DeForest N.); R., 1944; (E. B. WILLIAMSON × PRAIRIE SUNSET).
- CONCÉRTO. TB-M-R9D (Tompkins N.); R., 1943; etc.; #43-31; H.C., A. I. S. 1943; A. I. S. Bull. 90: 5. July 1943.
- COPPER BEECH. TB-M-La-R6M (Nes. N.); R., 1944; (PRAIRIE SUNSET × COPPER ROSE); #42-31A; □ sl.
- COPPER GLOW. TB-M-S7M (Douglas-G. 1944); R., 1944; (GAY TROUBADOUR) × ((RED BONNET) × (SOLDANO × CHINA CLIPPER)); #43-17; H.C., A. I. S. 1944; A. I. S. Bull. 94: 4-30. August 1944; □.
- COPPER ROSE. Etc.; (Cook 1941; etc.; A.M., A. I. S. 1943; A. I. S. Bull. 90: 3. July 1943.
- COQ. DB-E-Y4L (Loth. 1944); Loth. Gard. 1944; R., 1944; (CURIOSITY × ORANGE QUEEN).
- COTEAU HOLMES. Vinic-W4 (Coll. wild, Riggs 1940); R., 1944.
- COTILLION. TB-M-WW (Caldwell N.); R., 1944; #73-42; H.C., A. I. S. 1943; A. I. S. Bull. 90: 5. July 1943; □.
- COUNTRY LASS. TB-L₁-R9L (Walker N.); R., 1944; ((PURISIMA × RAMESES) × (CHINA MAID)); #38-44; □.
- Cours Le Reine. Muhle. 1944; COURS-LA-REINE.
- CREAM GLORY. TB-E-W4 (Fitzpatrick N.); R., 1944; (Sdlg. × GOLDEN MADONNA).
- CREAMO. TB-La-W4 (Fitzpatrick N.); R., 1944; (Sdlg. × GOLDEN MADONNA).
- CRESTED FAIRY. Ev-W3D (Henry N.); R., 1944 (Col. wild, Smoky Mountains, N. C., form of *I. cristata*).
- CYNASTRA. TB-VLa-Y4D (Allen-R.E. N.); R., 1944; ((GOLDEN MAJESTY × CORTEZ) × (LUCREZIA BORI × PAILLASSE)) × (LUCRE × VEDETTE); □ none.
- CYNOSURE. TB-La-W9M (Allen-R.E. N.); R., 1944; (((JOYCETTE × RADIANCE) × (ELLA WINCHESTER × E. B. WILLIAMSON)) × (Self))) × (WABASH); □.
- CYNTHIA. TB-La-Y3M (Allen-R.E. N.); R., 1944; ((WABASH × KING'S RANSOM) × (WABASH × VALIANT)); □ lo.
- CYPRESS ISLAND. Vinic-B7M (Riggs 1940); R., 1944; (natural hybrid in colony of natives).
- DADDY LONGLEGS. TB-La-S9M (Tobie N.); R., 1944; (WABASH × PHANTOM); □ M.
- DARJEELING. Ev-WW (Girid-

- lian 1944); Millik. 1944; R., 1944; (NADA × Self).
- *DARKLING THRUSH. TB etc.; (Douglas-M.E. N.); R., 1939; etc.; died out.
- DARKLING THRUSH. TB-EM-S6M (Douglas-M.E. N.); R., 1944; (NARANJA × CLAUDE AU-REAU); □ v.sw.
- DAWN FLUSH. TB-EM-Y9L (Douglas-M.E. N.); R., 1944; (SONG OF GOLD × AT DAWN-ING); □ str. sw.
- DAYBREAK. Etc.; (Klein. 1941); etc. A.M., A. I. S. 1943; A. I. S. Bull. 90: 3. July 1943.
- DEEP NIGHT. TB-E-La-B7D (Corey N.); R., 1944; (CYRUS THE GREAT × OZONE); □.
- DEEP RIVER. TB-EM-MLa-B1M (Wareham N.); R., 1944; (from Sdgs. derived from *trojana* and DOMINION).
- DELILAH. TB-M-R7L (Tompkins N.); R., 1943; etc.; #43-8; H.C., A. I. S. 1943; A. I. S. Bull. 90: 5. July 1943.
- DEL ROSA. TB-M-R7D (Loth. N.); R., 1944; (parentage lost).
- DESERT MOON. TB-M-La-Y4L (Wash. N.); R., 1944; (FAIRY LUSTRE × tall Y Sdlg.); #12-41; □.
- *DIANTHA. DB- etc.; must be obsolete as never listed for sale since before 1929.
- DIANTHA. TB-LaM-R4L (McKee N.); R., 1944; ((MIOBELLE) × (#3814 × MING YELLOW)); □ sl. lo.
- DINAH SHORE. TB-M-Y7D (Williams-T.A. N.); R., 1944; (Kirk. copper Sdlg. × Williams' Tan Sdlg. #39-700); #923B; □.
- DOLLY. TB-E-B3D (Bommers. 1942); R., 1944; (ROSE DOMINION × ROBERT W. WALLACE); □ cin.
- DOLOROSA. TB-MLa-B7M (Wareham N.); R., 1944; (from Sdgs. from *trojana* and DOMINION); □ sw. w.
- DORIS TEMPLETON. TB-M-S7M (Douglas-G. N.); R., 1944; (((RED BONNET) × (SOLDANO × CHINA CLIPPER)) × (Wash. #16-41)); #328A; □.
- Dorthy Dietz.** Tell Muhlestein 1944; DOROTHY DIETZ.
- DOULTON SCENE. TB-M-Y9M (Stevens-W.R. N.); R., 1944; (King Juba × Naranja); #1/P46.
- DOWN EAST. Etc.; (Tobie 1943); etc. H.M., A. I. S. 1943; A. I. S. Bull. 90: 4. July 1943.
- DREAMCASTLE. Etc.; (Cook. 1943); etc., H.M., A. I. S. 1944; A. I. S. Bull. 94: 3. August 1944.
- *DREAM GIRL. Etc.; (Hall-D. N.); etc.; R., 1942; etc.
- DREAM GIRL. TB-M-R4L (Hall-D. 1944); Hall-D 1944; R., 1944; (from two pink blend Sdgs.); #42-34.
- DR. GEORGE WASHINGTON CARVER. Vinic-R5M (Coll. wild, Abbeville, La., Riggs 1944); R., 1944.
- DR. JOHN K. SMALL. Vini-R1M (Randolph 1938); R., 1944; (parentage missing); A. I. S. Bronze Medal, 1940, Shreveport Iris Society annual show.
- Drop D'Or.** National 1944; DRAP D'OR.
- Drorothy Dietz.** Houdy- 1944; DOROTHY DIETZ.
- EARLY VICTORIAN. TB-M-R1M (Stevens-W.R. N.); R., 1944; ((MISS CALIFORNIA) × ((REWA × NEW DAWN) × (RADIANT MORN × NEW DAWN))); #1/P80.

- EASTER SUNRISE. TB-E-Y4L (Rees N.); R., 1944; (SNOW FLURRY × HAPPY DAYS); □ v. sl.
- EAST WIND. TB-M-La-B7D (Tobie N.); R., 1944; □ M.
- E. B. Eilliamson.** Horton 1944; E. B. WILLIAMSON.
- EDENLURE. TB-M-R6M (De Forest N.); R., 1944; (E. B. WILLIAMSON × PRAIRIE SUNSET); □ sl.
- EDITH. TB-E-W2Mrev. (Nash. N.); R., 1944; (SAN FRANCISCO × NENE Sdlg.).
- EDITH LOWRY. TB-E-R6M (Gage N.); R., 1944; (FRANK ADAMS × ETHELYN KLEITZ); #19-39-F; □.
- EDWARD. TB-M-B3D (Bommers. 1940); R., 1944; (SIR KNIGHT × LILAMANI); □ none.
- EDWARD J. ALEXANDER. Vinie-R4D (Coll. wild, Riggs 1944); R., 1944.
- EIVER. TB-M-B3M (Bommers. 1941); R., 1944; (BUECHLEY GIANT × BLUE TRIUMPH); □ none.
- ELMER. TB-La-W9L (Bommers. 1940); R., 1944; (PINK SATIN × ESTELLA); □ none.
- ELMOHR. Etc.; (Loomis 1942); etc., A.M., A. I. S. 1944; A. I. S. Bull. 94: 3. August 1944.
- EMMA. TB-M-R9D (Bommers. 1939); R., 1944; (PIUTE × SUMMER TAN); □ none.
- ERIC THE RED. Etc.; (Whitney 1943); etc., H.M. A. I. S. 1944; A. I. S. Bull. 94: 4. August 1944.
- ESDRAELON. TMB-E-R1D (White-C. G. N.); R., 1944; (LANDMARK × —); #1E-42-6.
- ESQUIRE. TB-M-B1D (Loth. N.); R., 1944; (Sdlg. #L8-40 × BRUNHILDE).
- ETHEL. Vinie-Y7M (Coll. wild, Riggs 1940); R., 1944.
- Ethelwyn Dubuar.** Amity Gardens 1944; ETHELWYNN DUBUAR.
- ETOILE D'OR. Etc.; (Douglas-G. 1943); etc.; H.M., A. I. S. 1943; A. I. S. Bull. 90: 4. July 1943.
- EUGENE. TB-E-R9M (Bommers. 1939); R., 1944; (ROSE DOMINION × ROSY WINGS); □ none.
- EULALIA. TB-M-S9L (Douglas-M.E. N.); R., 1944; (RAMESES × CAVATINA); □ sw.
- EVANGELINE. Vinie-Y4D (Coll. wild, Riggs 1939); R., 1944.
- EXQUISITE. TB-M-R4L (Nes. 1944); R., 1944; (Pink Marvel × Melitza); #42-3A; H.C., A. I. S. 1944; A. I. S. Bull. 94: 4-14-24; August 1944; □.
- EXTRAVAGANZA. Etc.; (Douglas-G. 1943); etc., H.M., A. I. S. 1944; A. I. S. Bull. 94: 3-15-30; August 1944.
- Fair Elain.** Muhle. 1944; **FAIR ELAINE.**
- Fair Lustre.** Horton 1944; **FAIRY LUSTRE.**
- *FANTASY. Etc.; (Hall-D. N.); etc.; R., 1944; etc.
- FANTASY. TB-E-R4L (Hall-D. N.); R., 1944; (from pink blend Sdgs.); #42-14; H.C., A. I. S. 1944; A. I. S. Bull. 94: 4. August 1944.
- FASHION PLATE. TB-M-R7L (Maxwell N.); R., 1944; (ALASTOR × MOROCCO ROSE); □ sl.
- FINELLA. TB-M-S6M (Gage N.); R., 1944; (RED POMP × FRANCESCA); #40/39-F; □ sl.
- FIRECRACKER. Etc.; (Hall-D. 1943); etc.; H.M., A. I. S. 1943; A. I. S. Bull. 90: 4. July 1943.
- FIRES OF AUTUMN. TB-E-Y9M (De Forest N.); R., 1944; (E. B. WILLIAMSON × FORTUNE).

- FLAMELY. Etc.; (Cook 1942); etc.; H.M., A. I. S. 1944; A. I. S. Bull. 94: 3; August 1944.
- FLAVA. TB-M-Y4L (Fitzpatrick N.); R., 1944; (Sdlg. × GOLDEN MADONNA).
- FLICKER. IMB-M-Y8D (Marx N.); R., 1944; (*auranitica* × CLARA NOYES; □ v.sl.
- FLIGHT LEADER. TB-M-R4D (Whiting N.); R., 1944; ((MATULA × GARDEN MAGIC) × (Co. Sdlg.)); #419; □ sl.
- Flora Campbel.** Muhle. 1944; FLORA CAMPBELL.
- FLORA ZENOR. Etc.; (Sass-J. 1941); etc.; A.M., A. I. S. 1944; A. I. S. Bull. 94: 3. August 1944.
- FLYING CADET. TB-M-La-B7D (Tobie N.); R., 1944; (SABLE × DOWN EAST); □.
- FORT KNOX. Etc.; (Millik. 1941); A.M., A. I. S. 1944; A. I. S. Bull. 94: 3. August 1944.
- FORTUNE'S FAVOUR. TB-M-La-Y3L (DeForest 1944); R., 1944; (E. B. WILLIAMSON × FORTUNE).
- FRANCELIA. Etc.; (McKee 1942); etc.; H.M., A. I. S. 1944; A. I. S. Bull. 94: 3-14-15. August 1944.
- FREEDOM. TB-M-WW (Smith-K. N.); R., 1944; (CAROLINE BURR × KATY); #4-25; □.
- *FRIGATE. Etc.; (Peck. N.); R., 1932; etc.
- FRIGATE. TB-E-M-MLa-WW (Peck. N.); R., 1944; (SAN DIEGO × SAN DIEGO); #39-15-2 □ none.
- FROSTED GLASS. TB-M-W4 (Bech. 1943); Schreiner 1943; R., 1944; (Sdlg. × Sdlg.).
- GARDEN FLAME. Etc.; (Sass-H. P. 1941); etc.; A.M., A. I. S. 1943; A. I. S. Bull. 90: 3. July 1943.
- GAY SENORITA. TB-M-Y9M (Salb. 1944); Salb. 1944; R., 1944; (((Y Sdlg.: ((ALTA CALIFORNIA × Sdlg.) × (MISS CALIFORNIA)) × (HAPPY GIFT × Sdlg.))).
- Genev. Serouge.** Horton 1944; GENEVIEVE SEROUGE.
- GIANT ORCHID. TB-M-R3M (Broddy N.); R., 1944; ((CUPAVO × CYDNUS) × (JOYCETTE)).
- Gilt Edge. TB-Y4L (Kirk. 1943); Vestal 1943.
- GLEE MAIDEN. TB-M-Y4M (Douglas-M.E. N.); R., 1944; (INDIAN CHIEF × HAPPY DAYS); □ sw.
- GOLD BEAM. TB-M-Y7D (Broddy N.); R., 1944; □ slight.
- GOLDBEATER. TB-M-Y4M (Klein. 1944); Cooley 1944; R., 1944; (Y Sdlg. #245 × FAR WEST); #301; □.
- GOLDEN AGATE. Spur-E-M-S6M rev. (Nies N.); R., 1944; (BRONZSPUR × Br. Sdlg.); #42-SL.
- Golden Cockeral.** National 1944; GOLDEN COCKEREL.
- GOLDEN HOUR. TB-M-Y4D (Woodnutt N.); R., 1944; (#39-38; SILKEN GOWN × RADAR); □ M.
- GOLDEN LUSTRE. TB-E-Y4D (Fass N.); R., 1944; (ALTA CALIFORNIA × GOLDEN HIND); □ none.
- GOLDEN PHEASANT. TB-La-R6D (Berry N.); R., 1944; (((CARDINAL × MAUNA LOA) × (PEERLESS × EREBUS)); #33-301-1; □ w.pl.
- GOLDEN SPANGLE. Etc.; (Cassebeer 1943); etc.; H.M., A. I. S. 1944; A. I. S. Bull. 94: 3-16. August 1944.

- GOLD MEDAL. TB-EE-Y4D (Fay N.); R., 1944; (CROWN OF GOLD × LADY PARAMOUNT).
- GRAND CANYON. Etc.; (Klein. 1941); etc.; A.M., A. I. S. 1944; A. I. S. Bull. 94: 3. August 1944.
- GUNMETAL. TB-M-S1D (Brehm N.); R., 1944; gunmetal gray.
- GYPSY. TB-M-S4M (Klein. N.); R., 1944; (MEXICO × TOBACCO ROAD); #317; □.
- GYPSY MAID. TB-M-S7M (Gage N.); R., 1944; (ARETHUSA × RED BONNET); #11/39-F; □ v. sl.
- GYPSY RED. Vinie-R4M (Debailon-Dormon N.) (Coll. wild by Debailon); R., 1944; 6" flower.
- GYPSY SONG. TB-M-S7L (Sapp N.); R., 1944; (Sdlg. × Hall-D. P. Sdlg.); □ ap.bl.
- HAPPY WARRIOR. TB-VLa-S6D (Tharp 1944); R., 1944; (LUTHER PETERSON × CROWN PRINCE); □ heavy grape.
- HARMONETTA. TB-M-B1M (White-C.G. N.); R., 1944; (parentage lost).
- HARRIETTE. TB-La-S1L (Bommers. 1939); R., 1944; (PAULETTE × PRESIDENT PILKINGTON); □ none.
- HARRIET THOREAU. TB-M-R7L (Cook 1944); Long. 1944; R., 1944; #6239.
- *HARVEST MOON. TB-M-Y7D (Whiting N.); R., 1942; etc.
- HARVEST MOON. TB-M-Y7D (Whiting 1944); R., 1944; (MIDWEST GEM × PRAIRIE SUNSET); #4121; □ ho.
- HEALSOME. TB-M-La-B1L (Douglas-M.E. N.); R., 1944; (BLACK BEAUTY × WINTER MOON).
- *HEART AGLOW. TB-EM-Y5L (Gers. N.); R., 1938; etc.
- HEART AGLOW. TB-M-W4 (Nes. N.); R., 1944; (SONG OF GOLD × MELITZA); #41-17A; □.
- HIELAN' LASS. TB-MLa-S7M (Douglas-M.E. N.); R., 1944; (BLAZING STAR × RAMESES); □ none.
- HIGHLIGHT. TB-S1M (Kirk. 1943); Vestal 1943.
- HILLS OF GOLD. TB-M-Y4D (Loth. N.); R., 1944; (SUNLAND × CHULA VISTA); □.
- *HINDUSTANI. TB-La-S9L (Gers. N.); R., 1940; etc.
- HIS EXCELLENCY. TB-E-La-Y9D (Smith-K. N.); R., 1944; (RAJAH × MARINELLA); #3-11.
- HONEY BALL. TB-E-Y6M (Gage N.); R., 1944; (W. R. DYKES × NARANJA); #10-A-X; □.
- HOOSIER SUNRISE. Etc.; (Lap. 1943); etc.; H.M., A. I. S. 1943; A. I. S. Bull. 90: 4. July 1943.
- IBERIAN. TB-MLa-Y9D (Wareham N.); R., 1944; (from Sdls. derived from *trojana* and DOMINION); □ sl.
- IDLEWILD. 1B-EM-S9L (Bailey-A. N.); R., 1944; (E. B. WILLIAMSON × COPPER LUSTRE); □ none.
- ILIUM. TB-EM-B1L (Douglas-M.E. N.); R., 1944; (DESERT GOLD × CUPAVO); □ sl.
- ILLINOIS SUNSHINE. TB-M-Y4D (Faught N.); (HAPPY DAYS × JEAN CAYEUX).
- IMBRIEL. TB-M-Y9L (Gage N.); R., 1944; (JEAN CAYEUX × ROSY WINGS); #25/35R; □.
- INDEPENDENCE DAY. Vinie-S7L (Coll. wild, Riggs 1940); R., 1944.
- INDIANA NIGHT. Etc.; (Cook 1942); etc.; A.M., A. I. S. 1944; A. I. S. Bull. 94: 3. August 1944.
- INGRID. TB-M-La-B3L (Rogers-

- Johnson N.); R., 1944; ((MORNING SPLENDOR × Sdlg.) × (SHINING WATERS)); □.
- INNISFAIL. TB-E-M-R7L (Douglas-M.E. N.); R., 1944; (AMBROSIA × IMPERIAL BLUSH).
- INVASION. TB-LaM-B3M (Hodson N.); R., 1944; (MISSOURI × MRS. VALERIE WEST); □ str. pl.
- ISLE LABBE. Vinic-W1 (Coll. Wild, Riggs 1939); R., 1944.
- IVORY TOWER. TB-E-Y6L rev. (Walker N.); R., 1944; (PURISSIMA × NARANJA); #2-44; □.
- JACK OF DIAMONDS. TB-EM-R7M (Monroe-Loth. N.); R., 1944; (parentage unknown).
- JAMES. TB-M-B9D (Bommers. 1939); R., 1944; (DAUNTLESS × BLUE MONARCH); □ lilac.
- JANICE IRENE. TB-M-La-B9M (Loth. N.); R., 1944; (Sdlg. × PERSIA).
- JASMINE. Etc.; (Grant 1943; etc.; H.M., A. I. S. 1944; A. I. S. Bull. 94: 3. August 1944.
- JASPER AGATE. Etc.; (Williams-Mrs. T. A. 1941); etc.; H.M., A. I. S. 1944; A. I. S. Bull. 94: 4. August 1944.
- JAUNE-BRUN. Vinic-Y5M (Nelson-I. N.); (Coll. in La.); R., 1944; Abbeville type.
- JESSAMY. TB-EM-Y4L (Douglas-M.E. N.); R., 1944; (CHEERIO × CHROMYLLA); □ sv.
- JEWELITE. TB-EM-S7D (Cassebeer N.); R., 1944; (JUNALUSKA × RADIANT); #14.
- JEWELS OF THE MADONNA. TB-EM-WW (Hodson N.); R., 1944; (EASTER MORN × Mt. Cloud).
- JOSEPHINE SMITH. TB-La-R1D (Bommers. 1939); R., 1944; (SPOKAN × JOYCETTE); □ none.
- JOSEPH LISTER. TB-MLa-Y9M (Douglas-M.E. N.); R., 1944; (VISION × NARANJA); □ none.
- JOY. Etc.; (Carp.-C. 1943); etc.; H.M., A. I. S. 1943; A. I. S. Bull. 90: 4. July 1943.
- J. S. WOODSWORTH. TB-M-B7D (Bartlett-E. N.); R., 1944; (NENE × BLACK WINGS); □ slight.
- KISH. IMB-E-R1M (White-C.G. N.); R., 1944; (Oncobred); □ none.
- KOWLOON. TB-MLa-Y9L (Douglas-M.E. N.); R., 1944; (Plurabelle × Rameses); □ sw.
- LA DIGGE. Vinic-R7L (Coll. wild, Riggs 1940); R., 1944.
- LADY BOSCAWEN. Etc.; (Graves N.); etc.; H.C., A. I. S. 1943; A. I. S. Bull. 90: 5. July 1943.
- LADY ESTHER. TB-MLa-R1L (Stephen. N.); R., 1944; (parentage unknown).
- LADYLIKE. TB-MLa-Y8L rev. (Dolman N.); (Y Plie. Sdlg. × ORLOFF); #331.
- LADY MOHR. Etc.; (Salb. 1943); etc. H.M., A. I. S. 1944; A. I. S. Bull. 94: 4. August 1944.
- LADY PATIENCE. Vinic-B7D (Coll. wild, Riggs 1940); R., 1944.
- LAFAYETTE. Vinic-R4D (Riggs 1939); R., 1944; (natural hybrid in garden of natives).
- LAGUNA. TB-MLa-B1M (Faught N.); R., 1944; (PURISSIMA × SANTA BARBARA).
- LAKE BREEZE. TB-M-B1L (Fay N.); R., 1944; (GLORIOLE × BALLET GIRL); #41-21; H.C., A. I. S. 1944; A. I. S. Bull. 94: 4. August 1944; □ sl.
- LAKE SHANNON. TB-M-B1L (DeForest N.); R., 1944; ((B Sdlg. from SOUV. DE LOETILIA

- MICHAUD \times JEAN CAYEUX) \times (GREAT LAKES)); \square sl.
- LA LOUISIANE. Vinie-S1M (Coll. wild, Riggs 1944); R., 1944.
- LAMPLIGHT. TB-M-S4M (Schreiner-R. N.); R., 1944; (AMITOLA \times ANGELUS); \square sl.
- LASCAR. TB-M-La-B1D (Peck. N.); R., 1944; ((Kirk. B. Sdlg. \times Kirk. B. Sdlg.) \times (SIERRA BLUE)); #39-19-100; \square none.
- LAVENDER GEM. TB-M-B9L (Broddy N.); R., 1944; ((CUPAVO \times CYDNUS) \times (JOYETTE)); \square sl.
- LAVENDER PEARL. TB-MLa-B1L (Fitzpatrick N.); R., 1944; (B Sdlg. \times WALLOWA LAKE).
- LEA. TB-La-S7M (McKee N.); R., 1944; (MARY VERNON \times MIOBELLE); \square none.
- LEMON CHIFFON. TB-E-Y4M (Bartlett-E. N.); R., 1944; ((BRUNO \times W. R. DYKES) \times (MARY BARNETT)).
- LEMOYNE. TB-M-Y4D (Faught N.); R., 1944; (W Sdlg. \times ---); \square .
- Lieut. Chavagnac. Houdy. 1944; LIEUTENANT DE CHAVAGNAC.
- LILLIAN ROTHFUSS. TB-E-B3D (Bommers. 1940); R., 1944; (E. B. WILLIAMSON \times MISSOURI); \square none.
- LIMBERLOST. TB-M-W2M (Tharp N.); R., 1944; (THEODOLINDA \times MME. LOUIS AUREAU).
- Lluvia D'Ova. National 1944; LLUVIA D'ORA.
- LOCH KATRINE 1B-E-M-B1M (Douglas-M.E. N.); R., 1944; (BLACK WINGS \times GLORIOLE).
- LORI MAY. Etc.; (DeForest 1941); etc.; H.M., A. I. S. 1944; A. I. S. Bull. 94: 4. August 1944.
- LOS ANGELES. Etc.; (Mohr-Mit. 1927); etc.; H.M., A. I. S. 1943; A. I. S. Bull. 90: 4. July 1943; A.M., A. I. S. 1944; A. I. S. Bull. 94: 3. August 1944.
- LOUISE BLAKE. Etc.; (Smith-K. 1942); etc.; H.M., A. I. S. 1944; A. I. S. Bull. 94: 4. August 1944.
- LUCILLIE. TB-E-B3M (Bommers. 1943); R., 1944; (SIR MICHAEL \times LARGO); \square none.
- *LUCYBELLE. TB-M-Y6L rev. (Gers. N.); R., 1939; etc.
- LULU. Vinie-S4L (Coll. wild, Riggs 1940); R., 1944.
- LUNAR BOW. TB-M-La-Y6L (Douglas-M.E. N.); R., 1944; (HAPPY DAYS \times MRS. VALERIE WEST).
- MADAM DORIAN. TB-LaM-S9D (Fitzpatrick N.); R., 1944; (parentage lost).
- MAESTRO. TB-M-S7D (Stevens-W.R. N.); R., 1944; ((DARK KNIGHT \times INSPIRATION) \times (WINSTON CHURCHILL)); #1/P-72; \square .
- Magador. National 1944; MOGADOR.
- Maid of Asalot. Muhle. 1944; MAID OF ASTOLAT.
- MAJENICA. Etc.; (Cook 1941); etc.; H.M., A. I. S. 1943; A. I. S. Bull. 90: 4. July 1943.
- MANCHURIA. TB-M-Y8M (Stevens-W.R. N.); 1944; (NARANJA \times FIRELIGHT); #2/P74; \square .
- MANDALAY. Etc.; (Hall-D. 1943); etc.; H.M., A. I. S. 1943; A. I. S. Bull. 90: 4. July 1943.
- MARDI GRAS. Vinie-RSD (Debaillon-Dormon N.) (Coll. in wild by Debaillon); R., 1944; Abbeville type.
- MARGUERITE ROUSSEAU. TB-La-B1M (Tobie N.); R., 1944; (MISSOURI \times MALLORCA).
- MARILYN O'CONNOR. TB-E-

- S4M (Gage N.); R., 1944; (JEAN CAYEUX × RAMESES); #201 37-B; □ sl.
- MARINE WAVE. 1B-EE-B1M (Schreiner-R. 1942); Schreiner 1942; Horton 1942; R., 1944; (APHYLLA OSIRIS × B TB).
- MARION VAUGHN. TB-M-La-Y4L (Smith-K. N.); R., 1944; (ELSA SASS × WOOD THRUSH); #4F54; □.
- MAR'JEAN. TB-MLa-B1M (Fitzpatrick N.); R., 1944; (B Sdlg. × SHINING WATERS).
- MARY BARTLETT. TB-La-R9D (Bartlett-E. N.); R., 1944; (NENE × DAUNTLESS); □ sl.
- MARY-BO. TB-M-S7L (Johnson N.); R., 1944; (CALIFORNIA GOLD × -----); □ sl.
- MARY E. NICHOLLS. Etc.; (Nic. 1939); etc.; A.M., A. I. S. 1943; A. I. S. 90: 3. July 1943.
- Mary Geddis.** Amity Gardens 1944; MARY GEDDES.
- MARY INWOOD. 1B-MLa-S9L (Douglas-M.E. N.); R., 1944; (CORALIE × RAMESES); □ sw.
- MARY SHORE. TB-M-S1M (Long-B.R. N.); R., 1944; A. I. S. Bull. 94: 67. August 1944.
- MASTER CHARLES. Etc.; (Wmsn. 1943); etc.; H.M., A. I. S. 1944; A. I. S. Bull. 94: 4. August 1944.
- MELODIST. TB-E-S7M (DeForest N.); R., 1944; (SALAR × TOBACCO ROAD); □ sl.
- MEXICO. Etc.; (Klein. 1943); etc.; H.M., A. I. S. 1944; A. I. S. Bull. 94: 4. August 1944.
- MINNE-LIED. TB-EM-R7L (Douglas-M.E. N.); R., 1944; (MRS. VALERIE WEST × EASTER MORN); □ sw.
- Minnie Colquit.** Maple. 1944; MINNIE COLQUITT.
- MINNIE COLQUITT. Etc.; (Sass-H.P. 1942); etc.; H.M., A. I. S. 1943; A. I. S. Bull. 90: 4. July 1943.
- MIOBELLE. Etc.; (McKee N.); etc.; H.C., A. I. S. 1943; A. I. S. Bull. 90: 5. July 1943.
- MISS VALLEJO. TB-E-R7M (Barnewitz N.); R., 1944; (EL CAPITAN × PINK SATIN); □ lilac.
- Mme. Durand.** Houdy. 1944; MME. DURRAND.
- Mme. L. Aureau.** Muhle. 1944; MADAME LOUIS AUREAU.
- Mme. Maurice Lassille.** Muhle. 1944; MADAME MAURICE LASSAILLY.
- MOLASSES. TB-M-S4M (White-Loth. N.); R., 1944; (parentage unknown); #6E-42-7.
- MOLLY MAY. TB-M-R6L (DeForest 1944); R., 1944; (LIGHTHOUSE × SALAR); □.
- MONA CALLING. TB-M-S9M (Douglas-M.E. N.); R., 1944 (NARANJA × CLAUDE AUREAU); □ sw.
- MOONLIGHT MADONNA. Etc.; (Sass-J. 1943); etc.; H.M., A. I. S. 1943; A. I. S. Bull. 90: 4. July 1943.
- MOONLIGHT SEA. Etc.; (Sass-J. 1943); etc.; H.M., A. I. S. 1943; A. I. S. Bull. 90: 4. July 1943.
- MORELOWINE. TB-EM-R7D (Bartlett-E. N.); R., 1944; ((Winneshiek) × ((NENE × DAUNTLESS) × (EGYPT))).
- Moroco Rose.** Muhle. 1944; MOROCCO ROSE.
- MOUNTAIN LAKE. Etc.; (Gers. 1933); etc.; A.M., A. I. S. 1944; A. I. S. Bull. 94: 3. August 1944.
- MRS. CHARLES POWERS. TB-E-B1M (Bommers. 1940); R.,

- 1944; (IMPERIAL BLUSH × THEODOLINDA); □ none.
- MRS. RUTHERFORD. TMB-M-B1L (Fletcher N.); R., 1944; ((PRINCE OF WALES × WILLIAM MOHR)); Can. Hort. Council 1944; □ str. pl.
- MRS. WALTER LAMB. TB-Re-S1L National 1944.
- Mt. Everest. Vestal 1943; MOUNT EVEREST.
- MULBERRY ROSE. Etc.; (Schreiner-R. 1941); etc.; H.M., A. I. S. 1943; A. I. S. Bull. 90: 4. July 1943; A.M., A. I. S. 1944; A. I. S. Bull. 94:3. August 1944.
- My Day (Thorn.). National 1944; MY DAY. (Tharp).
- NANCY HARDISON. Etc.; (Douglas-G. N.); etc.; H.C., A. I. S. 1943; A. I. S. Bull. 90: 5. July 1943.
- NATIONAL WHITE. TB-EM-WW (National 1944); National 1944 R., 1944.
- NELSON OF HILLY. Etc.; (White-C.G. 1941); etc.; A.M., A. I. S. 1943; A. I. S. Bull. 90: 3. July 1943.
- NIGHTFALL. Etc.; (Hall-D. 1942); etc.; H.M., A. I. S. 1943; A. I. S. Bull. 90: 4. July 1943.
- NIGHTINGALE. Etc.; (Hall-D. 1942); etc.; H.M., A. I. S. 1944; A. I. S. Bull. 94: 4. August 1944.
- N. J. THOMAS. TMB-M-B3M (Thom.-N.J.; Thorup 1944); Muhle. 1944; R., 1944; (WILLIAM MOHR × EL CAPITAN); A. I. S. Bull. 90: 77. July 1943.
- NORENE. TB-M-S7L (Kirk. 1942); Vestal 1942; National 1943, R., 1944. **Norine**; A. I. S. Bull. 92: 67. February 1944.
- NORTHLAND. TB-E-M-W6L (Tharp N.); R., 144; (DUCHESS OF MAIN STREET × HAPPY DAYS); □.
- *NYANA. TB-EM-S9M (Gers. N.); R., 1937; etc.
- OAHU. TB-LaM-S4M (Fitzpatrick N.); R., 1944; ((CORONADO × Sdlg.) × (Sdlg.)).
- OLA KALA. Etc.; (Sass-J. 1943); etc.; H.M., A. I. S. 1943; A. I. S. Bull. 90: 4. July 1943.
- OLD BRIER. TB-M-S4D (Tharp N.); R., 1944; ((CHIEF TALLBOY) × (MESSALINE × DAUNTLESS)).
- OLDEN ROSE. Vinic-S7M (Coll. wild, Riggs, Abbeville, La. 1944); R., 1944.
- OLD SPICE. Vinic-S4D (Nelson-I. N.) (Coll. in La.); R., 1944; Abbeville type.
- ORACLEO. TB-MLa-Y6D (Wareham N.); R., 1944; (from Sdls. derived from *trojana* and DOMINION).
- ORANGE FLUFF. TB-M-S7L (Dolman N.); R., 1944; ((CHALCEDONY × JUBILEE) × (GOLDEN SUNSET)); #214.
- ORANGE GLOW. Etc.; (Cassebeer 1942); etc.; H.M., A. I. S. 1944; A. I. S. Bull. 94: 4. August 1944.
- ORCHID FRILL. TB-EM-R1L (Fitzpatrick N.); R., 1944; (PURISSIMA × Sdlg.); □.
- Othello. TB (Beck. N.); A. I. S. Bull. 89: 26. April 1943.
- OVERTURE. Etc.; (Hall-D. 1943); etc.; H.M., A. I. S. 1944; A. I. S. Bull. 94: 4. August 1944.
- PACIFIC FLEET. TB-M-B7M (Walker N.); R., 1944; (SAN DIEGO × NARANJA); #14-44; □.
- PACIFIC SUNSET. TB-M-S7M (Salb. 1944); Salb. 1944; R., 1944; ((RADIANT × HAPPY GIFT)

- × (NATOMA × MISS CALIFORNIA)).
- PARATROOPER. TB-M-WW (Fay N.); R., 1944; (GLORIOLE × W. Sdlg. #39-3); □ sl.
- PASTEL CLAY. TB-M-S4L (Dysart N.); R., 1944; (DOLLY MADISON × -----).
- PAT. TB-E-R3D (Bommers. 1942); R., 1944; (PAULETTE × SHINING WATERS); □ none.
- PATRICE. TB-M-YSM (DeForest N.); R., 1944; (TIFFANY × SALAR) □.
- PERFECT DAY. TB-M-R4L (Woodnutt N.); R., 1944; (SILKEN GOWN × RADAR); □ str.
- PERLE DORE. TB-La-Y4L (Wareham N.); R., 1944; (from Sdls derived from *trojana* and DOMINION); □ sl.
- PERUVIAN GOLD. Etc.; (Tobie N.); R., 1943; (HAPPY DAYS × ALTA CALIFORNIA); etc.
- PESHAWAR. Etc.; (Schreiner-R 1937); etc.; A.M., A. I. S. 1943; A. I. S. Bull. 90: 3. July 1943.
- PINK CAMEO. TB-M-R4L (Fay N.); R., 1944; (#41-40 × OVERTURE); #44-01; □ sl.
- PINK EPILOGUE. TB-VLa-S7L (Dolman N.); R., 1944; (RAMESES × MACAROON); #263; □.
- PINK PERFECTION. Vinie-R7L (Coll. wild, Riggs 1940); R., 1944.
- PINK RADIANCE. TB-MLa-R7M (Stephen. N.); R., 1944; (FAR WEST × SPRING MAID); #38.
- PINK REFLECTION. Etc.; (Cook 1942); etc., A.M., A.I.S. 1944; A. I. S. Bull. 94: 3. August 1944.
- PIROUETTE. 1B-La-M-B1L (Cassebeer N.); R., 1944; (CYBELE × GREAT LAKES); #56; □ sl.
- POLLY. TMB-M-B1M (Williams-F.F. 1944); Loth. 1944; R., 1944; (SWEET ALIBI × 1C7 (derived from *susiana*)).
- POLYNESIA. TB-M-S4L (Stevens-W.R. N.); R., 1944; ((GOLDEN HIND) × (INSPIRATION × INDIAN CHIEF)); #2/020; □.
- *POMONA. Sib-etc. (Gers. N.); R., 1933; etc.
- POMONA. Sib-E-M-B7M (Gers. N.); R., 1944; (CAESAR'S BROTHER × MOUNTAIN LAKE).
- Porcelain Bty. Horton 1944; PORCELAIN BEAUTY.
- PRAIRIE SUNSET. Etc.; (Sass-H.P. 1939); etc.; Dykes Medal, A. I. S. 1943; A. I. S. Bull. 90: 3. July 1943.
- *PREMIER. TB-etc. (Millik. 1941); R., 1941; etc.
- *PREMIER. TB-etc. (Hall-D. N.); R., 1943; etc.
- PREMIER PEACH. TB-La-R4L (Hall-D. N.); R., 1944; (from two pink blend Sdls.); H.C., A. I. S. 1944; A. I. S. Bull. 94: 4. August 1944.
- Pres Pilkington. Houdy. 1944; PRESIDENT PILKINGTON.
- PRINCE OF ORANGE. Etc.; (Klein. 1940); etc.; A.M., A. I. S. 1944; A. I. S. Bull. 94: 3. August 1944.
- PRISCILLA. Etc.; (Whiting 1942); etc.; H.M., A. I. S. 1943; A. I. S. Bull. 90: 4. July 1943.
- PURPLE PRINCE. 1B-Re-R7D (Dysart N.); R., 1944; (¼ CRIMSON KING).
- PURPLE SCEPTRE. TB-M-B7M (Berry N.); R., 1944; (parentage missing); □ good.
- PURPLE SUPREME. TB-MLa-B7D (Tobie N.); R., 1944; (CYRUS THE GREAT × SABLE); #44-1; □ m.
- QUEEN MARIE LAVEAU. Vinie-

- R7L (Coll. wild, Abbeville, La. Riggs 1944); R., 1944.
- QUICKENING SPIRIT. TB-M-Y9D (Douglas-M.E. N.); R., 1944; (DOROTHY DIETZ × VISION); □ sl.
- RABELAIS. TB-MLa-S9D (Douglas-M.E. N.); R., 1944; (A35-10 × DARK KNIGHT); □ none.
- RAJAH BROOKE. TB-LaM-Y9D (Norton-L. N.); R., 1944; (MATULA × GARDEN MAGIC); □ sl.
- RANGER. Etc.; (Klein. 1943); etc.; H.M., A. I. S. 1944; A. I. S. Bull. 94: 4. August 1944.
- RASTUS. 1B-VLa-S7D (Fitzpatrick N.); R., 1944; (Sdlg. × CRIMSON KING); □ str.
- RED AMBER. Etc.; (Loomis 1942); etc.; H.M., A. I. S. 1943; A. I. S. Bull. 90: 4. July 1943.
- REDLANDS. TB-M-B7D (Loth. N.); R., 1944; (Sdlg. × Sdlg.).
- RED MAJESTY. TB-M-La-R4D (Douglas-G. N.); R., 1944; (Hall P. Sdlg. #2 × Wash. #40-100); #333A; □.
- RED RHAPSODY. TB-La-R6D (Hodson N.); R., 1944; (THE RED DOUGLAS × CHRISTABEL); □ str. pl.
- RED VALOR. Etc.; (Nie. 1939); etc.; A.M., A. I. S. 1943; A. I. S. Bull. 90: 3. July 1943.
- REDWYNE. TB-M-R7D (McKee N.); R., 1944; (((CHRISTABEL × TENAYA) × (JANET BUTLER) × (RED COMET)); H.C., A. I. S. 1944; A. I. S. Bull. 94: 4. August 1944; □ none.
- REMEMBRANCE. Etc.; (Hall-D. 1942); etc.; H.M., A. I. S. 1943; A. I. S. Bull. 90: 4. July 1943; A.M., A. I. S. 1944; A. I. S. Bull. 94: 3. August 1944.
- REV. CLIPPINGER. TB-La-B1D (Bommers. 1940); R., 1944; (BRUNHILDE × NENE); □ none.
- RIO-SUN. TB-M-La-S7M (Tharp N.); R., 1944; (MIST O'ROSE × JEAN CAYEUX).
- RITOURNELLE. TB-M-B1M (Peck. N.); R., 1944; (Kirk. B Sdlg. × BONSOR); #38-10-44; □ str.sw.
- Robinhood. TB-Y6L (Kirk. 1943); Vestal 1943.
- Robroy. Vestal 1943; ROB ROY.
- RODOMONT. TB-La-R9D (Douglas-M.E. N.); R., 1944; (KENWOOD × ETHEL PECKHAM); □ none.
- Rose Dore. Horton 1944; ROSE VALLEY.
- ROSE FESTIVAL. TB-M-R7L (Klein. N.); R., 1944; (R Sdlg. #240 × E. B. WILLIAMSON); #285; □.
- ROSE TOP. Etc.; (Sass-H.P. 1941); etc.; H.M., A. I. S. 1943; A. I. S. Bull. 90: 4. July 1943.
- ROSIE. TB-E-R9M (Dolman N.); R., 1944; (INDIAN CHIEF × Helios (Cay.)); #177; □.
- ROYAL POTENTATE. TB-La-R7D (Fitzpatrick N.); R., 1944; (from a line of Sdlgs. dating back to Archeveque).
- ROYAL SCOT. TB-M-Y8D (Hall-D. 1944); Hall-D. 1944; R., 1944; (ORLOFF × ELSA SASS); #40-95; H.M., A. I. S. 1944; A. I. S. Bull. 94: 4. August 1944.
- ROYAL VINTAGE. TB-EM-R1D (Fitzpatrick N.); R., 1944; (PURISSIMA × Sdlg.); □.
- RUFFLED ROBIN. TB-VLa-R7M (Berry N.); R., 1944; ((APHRODITE) × (LADY FOSTER × SHEKINAH)) × (PLUIE D'OR); #30-196-1; □ good.
- RUSSET FLAME. Spur-M-La-S4M (Nies N.); R., 1944; (BRONZSPUR ×).
- RUSSET MANTLE. TB-EM-R6D

- (Schreiner-R. N.); R., 1944;
(WABASH × AT DAWNING); □
none.
- SAFI. TB-EM-Y8L (Dolman N.);
R., 1944; (RAMESES × MACA-
ROON); #272A; □.
- *SARD. TB-M-R4M (Loth. N.) R.,
1943; (Sdlg. × CHEERIO); with-
drawn from registration 1944.
- SARDIS. TMB-E-S1L (White-
C.G. N.); R., 1944; (*oncobred*);
□ v.sl.
- SATICOY. TB-M-Y9D (Walker
N.); R., 1944; ((PURISSIMA ×
RAMESES) X (TIGER TIGER));
#5-44; □.
- SEQUATCHIE. Etc.; (Cald.
1943); etc.; H.M., A. I. S. 1944;
A. I. S. Bull. 94: 4. August 1944.
- SHADY LANE. TB-La-B1M
(Hodson N.); R., 1944; (Mis-
souri × SIERRA BLUE); □ str.pl.
- SHARKSKIN. Etc.; (Douglas-G
1943); etc.; H.M., A. I. S. 1943;
A. I. S. Bull. 90: 4. July 1943.
- SHELL. DB-M-R7L (Loth. 1944);
Loth. Gard. 1944; R., 1944.
- SHERIFFA. Etc.; (White-C.G.
1943); etc.; H.M., A. I. S. 1943;
A. I. S. Bull. 90: 4. July 1943.
- SHISHALDIN. TB-M-Y7M (De-
Forest 1944); R., 1944; (Brown
Sdlg. × PRAIRIE SUNSET).
- SHOW GIRL. TB-M-R4L (Nelson-
E. N.); R., 1944; (RAMESES ×
PRAIRIE SUNSET); □ sl.
- SIBLEY. TB-EM-W1 (Dolman
N.); R., 1944; (GOLD FOAM ×
CALIFORNIA GOLD); #290; □.
- Siera Blue.** Muhle. 1944; SIERRA
BLUE.
- SILENT NIGHT. TB-EM-WW
(Woodnutt N.); R., 1944;
((GUDRUN Sdlg. × SNOWKING)
× (ARCHANGEL)); □ sw.
- SILKEN GOWN. TB-M-S1M
(Woodnutt N.); R., 1944; ((FRA
- ANGELICO (Vilm.) × SIR
MICHAEL) × (DOLLY MADISON));
□ sw.
- SINALOA. TB-MLa-Y8L (Doug-
las-M.E. N.); R., 1944; (C35-14
× SIEGFRIED); □ sl.
- SKYLINE. TB-R9L (Kirk. 1943);
Vestal 1943.
- SMOKE-DREAM. (Everett N.);
A. I. S. Bull. 89: 26. April 1943;
Smoke Dream.
- SNOW CARNIVAL. Etc.; (Graves
1940); etc.; A.M., A. I. S. 1944;
A. I. S. Bull. 94: 3. August 1944.
- SNOW CRYSTAL. TB-M-W2L
(Wills N.); R., 1944; ((SENSA-
TION × PAULETTE) × (NARAIN));
#24-42-215.
- Snowqualmie.** National 1944;
SNOQUALMIE.
- SOLID MAHOGANY. Etc.; (Sass-
J. 1943); etc.; H.M., A. I. S.
1944; A. I. S. Bull. 94: 4. Au-
gust 1944.
- Soub-d L.Michaud.** Horton 1944;
SOUV. DE LOETTITIA MI-
CHAUD.
- SOUSUN. Etc.; (Essig 1942);
etc.; H.C., A. I. S. 1944; A. I. S.
Bull. 94: 4. August 1944.
- SPINDRIFT. TB-LaM-R4L
(Loomis N.); R., 1929; #TQ-70.
- SPIRIT MAGNOLIA. TB-MLa-
W4 (Wareham N.); R., 1944;
(from Sdls. derived from *tro-
jana* and DOMINION); □ sl.
- SPRING AZURE. TB-La-B1L
(Wareham N.); R., 1944; (from
Sdls. derived from *trojana* and
DOMINION); □ sw.
- SPRING FURLOUGH. TB-M-
W7L (Faught N.); R., 1944;
(White Sdlg. × MELITZA).
- SPRING GLOW. IB-EE-R4D
(Schreiner-R. 1942); Schreiner
1942; Horton 1944; R., 1944;
(CHEERIO × red garnet dwf.
Sdlg.).

- SPRING RAINBOWS. Vinie-S7L (Riggs 1939); R., 1944; (natural hybrid in garden of natives.)
- SPUN GOLD. Etc.; (Glutzbeck 1939); etc.; Dykes Medal, A. I. S. 1944; A. I. S. Bull. 94: 3. August 1944.
- STARDOM. Etc.; (Hall-D. 1941); etc.; A.M., A. I. S. 1943; A. I. S. Bull. 90: 3. July 1943.
- STARLESS NIGHT. Etc.; (Sass-J. 1941); etc.; H.M., A. I. S. 1943; A. I. S. Bull. 90: 4. July 1943.
- STELLA VIOLA. TB-M-B7M (Snyder N.); R., 1944.
- ST. REGIS. TB-M-B1L (Caldwell N.); R., 1944; (BIRCHBARK × GREAT LAKES); #26-44B; H.C., A. I. S. 1944; A. I. S. Bull. 94: 4. August 1944; □ str.
- STYLE KING. TB-E-W2M (Hodson N.); R., 1944; (SAN FRANCISCO × WILLIAM CAREY JONES); □ str. pl.
- SUEY SIN FAH. TB-La-R4L (Dolman N.); R., 1944; (Rameses × Macaroon); #227; □.
- SUEZ. TMB-M-R1D (Schreiner-R. N.); R., 1944; (WILLIAM MOHR × MME. LOUIS AUREAU).
- S. U. I. TB-M-Y9D (Bailey-A. N.); R., 1944; (E. B. WILLIAMSON × COPPER LUSTRE); □ str.
- SUKEY OF SALEM. TB-La-S4D (Nes. N.); R., 1944; (BUCCANEER × PRAIRIE SUNSET); #43-30; □ sl.
- SULPHUR KING. TB-E-Y3L (Gage N.); R., 1944; (W. R. DYKES × NARANJA); #10-A-5; □ sl.
- SUMMERTIME. TB-La-Y4D (Caldwell N.); R., 1944; ((BETTY NESMITH × JEAN CAYEUX) × (GOLDEN MAJESTY)); #31-43; □ sl.
- SUN DIAL. TB-EM-Y7M (Wills N.); R., 1944; (FAR WEST × MIDWEST GEM); #199-2-41; H. C., A. I. S. 1944; A. I. S. Bull. 94: 4-27. August 1944; □ sl.
- SUNLAND. TB-M-Y4D (Monroe N.); R., 1944; (parentage lost).
- SUNRISE LIGHTS. Vinie-R4M (Coll. wild, Riggs 1939); R., 1944.
- SUNSET SERENADE. Etc.; (Sass-J. 1943); etc.; H.M., A. I. S. 1943; A. I. S. Bull. 90: 4. July 1943.
- SUN SHADOW. TB-M-Y4M (Sapp N.); R., 1944; ((Y Sdlg.) × (GOLDEN TREASURE × NARANJA)).
- SUZZY. TB-E-B7D (Bommers. 1939); R., 1944; (JUNALUSKA × DIRECTEUR PINELLE); □ none.
- TAM O'SHANTER. IB-M-MLa-Y9D (Douglas-M.E. N.); R., 1944; (DOROTHY DIETZ × VISION).
- TANTOO. TB-M-Y9L (Fitzpatrick N.); R., 1944; (Y Sdlg. × GOLDEN MADONNA); □.
- TEAL. TB-M-S9D (Loth. N.); R., 1944; (DOROTHY DIETZ × SPRING MEMORY).
- TEA ROOM. TB-M-R⁷L (Tharp N.); R., 1944; (MY CHOICE × LYNDON); □ mixed fruits.
- TEA ROSE. TB-M-S7L (Whiting 1944); R., 1942; etc.; H.C., A. I. S. 1943; A. I. S. Bull. 90: 5. July 1943.
- TELLSONNY. TB-M-R1D (Bommers. 1939); R., 1944; (LUX × KING TUT); □ none.
- TERN. TB-M-S1L (Loth. N.); R., 1944; (LADY GRACE × PIERRE).
- THE ADMIRAL. Etc.; (Hall-D. 1941); etc.; A.M., A. I. S. 1944; A. I. S. Bull. 94: 3. August 1944.
- THE CAPITOL. TB-M-W4 (Maxwell N.); R., 1944; (LA GLORIA × GLORIOLE); □ sl.

- THE GAY GALLARD. TB-M-Y9M (Nes. N.); R., 1944; (SAM-OVAR × RADIANT); #42-57A.
- THE GOLDEN TOUCH. IB-EM-Y4D (Douglas-M.E. N.); R., 1944; (NARANJA × CLAUD AU-REAU).
- THE PURPLE HEART. TB-M-La-B7D (Tobie N.); R., 1944; (Down East × Sable); H.C., A. I. S. 1944; A. I. S. Bull. 94: 4-25. August 1944; □ m.
- *THE RAVEN. TB-M-R1D (Whiting N.); R., 1940; etc.
- THE RAVEN. TB-M-R1D (Whiting 1944); R., 1944; (LILAMANI × SMOLDER); #4335; □ gr.
- THUNDERHEAD. TB-M-WW (Smith-K. N.); R., 1944; (CAROLINE BURR × KATY); #4-26.
- TIDY LASS. TB-E-M-W1 (Douglas-M.E. N.); R., 1944; (SITKA × SENLAC); □ sl.
- TIFFANJA. Etc.; (DeForest 1942); etc.; H.M., A. I. S. 1944; A. I. S. Bull. 94: 4. August 1944.
- TIFFANY. Etc.; (Sass-H.P. 1938); etc.; A.M., A. I. S. 1943; A. I. S. Bull. 90: 3. July 1943.
- Timigami.** Vestal 1943; TIMAGAMI.
- TIP TOP. TB-La-W3D rev. (Hall-D. N.); R., 1944; (B Sdlg. × B trimmed Plie. Sdlg.); #43-12.
- TISHOMINGO. Etc.; (Cald. 1941); etc.; A.M., A. I. S. 1944; A. I. S. Bull. 94: 3. August 1944.
- TOBACCO ROAD. Etc.; (Klein. 1941); etc.; H.M., A. I. S. 1944; A. I. S. Bull. 94: 4. August 1944.
- TONATIUH. TB-M-S9M (DeForest N.); R., 1944; (LATE SUN × PRAIRIE SUNSET).
- TOTO. Vinie-B1L (Coll. wild, Riggs 1939); R., 1944.
- TREASURE CHEST. TB-La-Y5D rev. (Douglas-G. N.); R., 1944; ((40-20: SOLDANO × CHINA CLIPPER) × (ROYAL COACH)); #43-26; □.
- TRICORNE. TB-M-W1 (Peck. N.); R., 1944; (TIFFANY × Sdlg.); #40-1-50A; □ none.
- TRUE LOVE. TB-M-R4L (Wills N.); R., 1944; ((LILY PONS × HAPPY DAYS) × (Hall's rosy sister Sdlg. of Stardom #39-85)); #21-42; H.C., A. I. S. 1944; A. I. S. Bull. 94: 4-27. August 1944; □.
- TULVA. Vinie-R4D (Coll. wild, Riggs-Mrs. 1944); R., 1944.
- TUNKHANNOCK. Sib-M-WW (Scheffy N.); R., 1944; large.
- TUTTI-FRUTTI. TB-M-S7D (White-Loth. N.); R., 1944; #1-42-2.
- TWILIGHT ORANGE. TB-La-M-Y7D (Wareham N.); R., 1944; (from Sdls. derived from *trojana* and DOMINION).
- TWO OPALS. Spur-M-La-W9L rev. (Nies N.); R., 1944; (FIFTH SYMPHONY × SAUGATUCK).
- TYCHE. TB-M-W3M rev. (Wash. N.); R., 1944; (parentage lost); #41-22; □.
- UPAROKAS. TB-M-S6D (Douglas-M.E. N.); R., 1944; (PERSIA × JUNALUSKA); □ sp.
- VALCLUSA. TB-M-S6D (Douglas-M.E. N.); R., 1944; (VISION × Helios (Cay.)).
- VAL DORÉ. TB-M-S6D (Douglas-M.E. N.); R., 1944; (VARESE × SUNDUST).
- VALLOMBROSA. TB-EM-Y6D (Douglas-M.E. N.); R., 1944; (NARANJA × C35-6); □ sw.
- VAMP. TB-M-R4D (Loth. N.); R., 1944; (parentage lost).
- VANTAGE. TB-M-S9D (Loth. N.); R., 1944; (PIERRE × PERSIA).
- VARSITY. TB-La-M-R7D (Hodson

- N.); R., 1944; (THE RED DOUGLAS × CHRISTABEL); □ pl.
- VATICAN PURPLE. Etc.; (Whiting 1942); etc.; H.M., A. I. S. 1943; A. I. S. Bull. 90: 4. July 1943.
- VELASQUEZ. IB-M-Y4M (Douglas-M.E. N.); R., 1944; (VARESE × SUNDUST); □ sw.
- VERNAL EVENING. Ver-B7D (Henry N.; Coll. in Meriwether Co., Ga.); R., 1944.
- VERNAL FAIRY. Ver-W3L rev. (Henry N.; Coll. Bath Co., Va.); R., 1944.
- VERNAL SIMPLICITY Ver-B7L (Henry N.; Coll. in Winston Co., Ala.); R., 1944.
- VINEYARD. Vinic-R7M (Debailon-Dormon 1944); Wild Garden 1944; R., 1944.
- VIOLET SYMPHONY. Etc.; (Smith-K. 1940); etc.; A.M., A. I. S. 1943; A. I. S. Bull. 90: 4. July 1943.
- VIRGINIA. TB-VLa-Y9M (Allen-R.E. N.); R., 1944; (CLOVELLY × CORTEZ); □ sw. cl.
- VIRGINIA PHILLIPPS. TB-E-B1M (Bommers. 1943); R., 1944; (LOS ANGELES × EL CAPITAN); □ none.
- VISION OF MIRZA. TB-M-Y8M (DeForest 1944); R., 1944; (TIFANY × SALAR).
- *VIVOLA. TB-VLa-R9M (Gers. N.); R., 1936; etc.
- VULCAN'S IMP. TB-MLa-R6M (Wareham N.); R., 1944; (from Sdlgs. derived from *trojana* and DOMINION); □ sl.
- WALLOWA LAKE. TB-M-R3L (Fitzpatrick N.); R., 1944; ((ASIA × MRS. VALERIE WEST) × (Sdlg.)).
- WANETA. TB-La-R1D (Bommers. 1940); R., 1944; (DESTINY × MELDORIC); □ none.
- *WARRIOR QUEEN. TB-MLa-R9D (Gers. N.); R., 1937; etc.
- WAVES. TB-M-W1 (Peck. N.); R., 1944; ((W Sdlg.) × (CALIFORNIA GOLD × LOS ANGELES)); □ sl.
- WESTOVER. TB-M-W1 (Douglas-M.E. N.); R., 1944; (WINTER MOON × FORTUNIO); □ none.
- WEST SEATTLE. TB- (Hend.-W.H.); Horton 1944.
- WHISPERWOOD. TB-Re-B1M Kirk; National 1944.
- WHITE FLARE. TB-EM-WW (Fitzpatrick N.); R., 1944; (PURISSIMA × Sdlg.).
- WHITE PEACOCK. TB-M-WW (Faught N.); R., 1944; (PERSIA × Helios (Cay.)).
- WHITE RADIANCE. IB-M-MLa-WW (Douglas-M.E. N.); R., 1944; (WINTER MOON × SNOWKING); □ sl.
- WHITE WEDGEWOOD. Etc.; (Grant 1943); Etc.; H.M., A. I. S. 1943; A. I. S. Bull. 90: 4. July 1943.
- WILLIAM. TB-E-R9D (Bommers. 1939); R., 1944; (SOUV. DE MME. GAUDICHAU × TAJ MAHAL); □ none.
- WISTFUL. TB-La-S7L (Berry N.); R., 1944; (APHRODITE × PRIMROSE) × (ENDYMION); #29-102-3; □ pl.
- WOOD WINDS. TB-M-S9M (Tharp N.); R., 1944; (MIST O'ROSE × LYNDON); □.
- Yvonne Pellitier.** Houdy. 1944; YVONNE PELLETIER.
- ZION. TB-E-M-S6D (Douglas-M.E. N.); R., 1944; (INDIAN CHIEF × HAPPY DAYS).
- ZION CANYON. TB-EM-Y9M (Bailey-A. N.); R., 1944; (E. B. WILLIAMSON × COPPER LUSTRE); □ none.

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